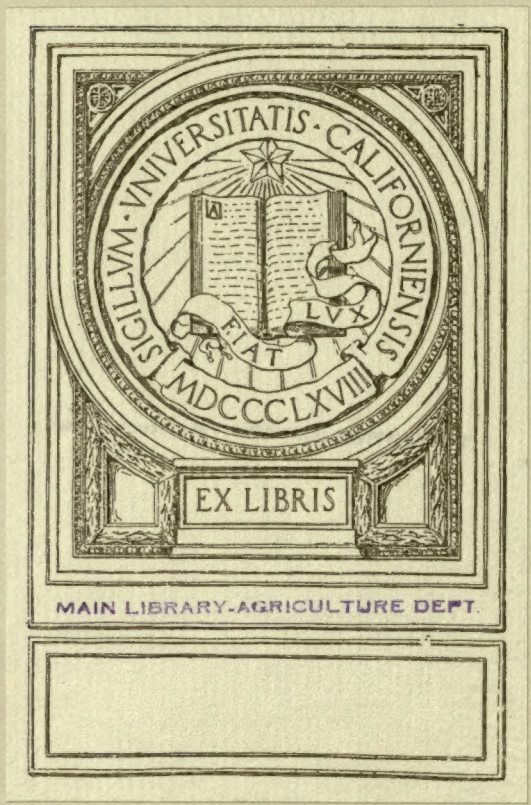

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PART XI

SEVENPENCE NET

CASSELL'S DICTIONARY OF GARDENING

EDITED BY

WALTER P. WRIGHT

HORTICULTURAL SUPERINTENDENT UNDER THE KENT COUNTY COUNCIL AUTHOR OF "PICTORIAL PRACTICAL GARDENING" EDITOR OF *THE GARDENER* ETC.

WITH SPECIALLY PREPARED COLOURED PLATES AND OTHER ILLUSTRATIONS

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DICTIONARY OF PRACTICAL GARDENING

AN ILLUSTRATED ENCYCLOPÆDIA

OF

PRACTICAL HORTICULTURE FOR ALL CLASSES

EDITED BY

WALTER P. WRIGHT

HORTICULTURAL SUPERINTENDENT UNDER THE KENT COUNTY COUNCIL

Vol. II

CASSELL AND COMPANY, LIMITED

LONDON, PARIS, NEW YORK & MELBOURNE

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LIST OF PLATES.

Liliums	*Frontispiece*	
Michaelmas Daisies	*To face p.*	72
Narcissi	„	100
Nymphæas	„	120
Orchids	„	142
Pæonies	„	152
Primulas	„	234
Rhododendrons	„	270
Roses	„	284
Strelitzias	„	388

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CASSELL'S DICTIONARY OF PRACTICAL GARDENING.

VOLUME II.

LAWN MOWERS.

The mowing machine is indispensable in every garden, no matter whether the grass comprises many acres or whether it be represented by a strip or plot a few feet wide. There are almost innumerable "makes" of machines, differing from each other not only in size and matters of minor construction, but in their suitability for working upon different gradients. The general principle of working consists of having a broad, flat blade—the "sole plate" or "ledger plate"—fitted horizontally so that it lies flat upon the grass. Spirally twisted blades, arranged in a "barrel" or cylinder, are brought with a forward turning motion so that their cutting edges work against the ledger plate, and the cutting is done between them. There are various methods of making the cutting blades revolve. In many machines they are connected by a series of cog wheels with rollers at the back of the machine. These rollers, or "drums" as they are technically called, are set in motion by the whole machine being pushed forward, so that the motive force is applied exactly as in a garden roller. The "chain and wheel" system, employed in not a few machines, is a modification of the cog wheels. Its advantages are great durability, ease of working, and decreased weight, but there is the danger of the chain slipping off the cogs when it is very loose and the machine is working on a slope.

The ledger plate can be raised or lowered at will so as to give a very close or a light cutting. The older machines had to be turned over to adjust the ledger plate; in the newer ones this is done by a special screw adjustment. Other improvements consist of ribbed instead of plain rollers, and these give a better hold on sloping ground. In some of the modern machines, the blades are twisted in two directions, the result being that the cut grass is thrown into the centre of the collecting box fixed in front of the cutters, and the cuttings are more cleanly picked up. Collecting boxes are fitted to most machines, although they are not essential. To facilitate the balancing of the machine, and also to conduce to easy working, rollers are fixed in front as well as behind. When mowing machines are being moved from place to place upon their own rollers, the drums and cogs should be disconnected, so that the revolutions of the rollers do not affect the cutting blades. In the case of long distances, however, it is advisable to lift the machine into a cart and transport it thus.

For small lawns a 10″ machine, that is, one the length of whose cutters is 10″, is large enough for all purposes. The difficulty of draught increases, of course, with the size and weight of the machine. Thus a 20″ will need a man to push, and a boy to pull. For the bigger ones used on large lawns and cricket grounds, horse power is usually employed. Well-trained horses may be driven, but it is well to have a boy to lead the horses. Steam power is occasionally employed, and petrol motors may be expected to supersede horses.

All mowing machines must be kept scrupulously clean and thoroughly oiled. A few small stones in the machinery will soon do damage out of all proportion to the value of the time involved in occasionally overhauling the working parts. Careful housing in a dry shed in winter is also necessary, as well as a thorough overhauling.

Not a few gardeners prefer to use the scythe upon young lawns, and early in the season, as they hold that the close cutting by the machine is injurious at this stage. The danger is removed by setting the ledger plate up high, and giving two light cuttings instead of a close one. In hot weather also, close cutting must be avoided, for if the tender roots of the grass are laid bare many ugly dead patches will result. Edge-clippers are occasionally seen in use, although up to the present they have not been altogether a success. They must have a plumb, clean verge to work upon, and a hard bottom, free from loose stones. They are difficult to guide straight, or to work round sharp curves.

LAWNS.

The grass lawn is an indispensable feature of all gardens. It may vary in size from a few feet to hundreds of yards in length; it may be of any shape, and its surface may be level or sloping. As a rule the spot chosen is in close proximity to the house, and there is no doubt that, if the turf be properly kept, there is no better setting for any style of architecture.

The expanse of grass may be varied at the will of the owner, by cutting in it flower beds of various sizes and shapes, and by planting specimen trees here and there, but it is well to remember that it is very easy to cut too many flower beds—as a rule, small beds and intricate designs, with narrow grass paths, should be avoided. Moreover, large trees are not to be recommended, although those of neat habit are permissible.

Though the routine of mowing, manuring, watering, and rolling is of the first importance in keeping up the appearance of a lawn, it is imperatively necessary that it be carefully made in the first place. Stagnant, water-logged soil encourages moss and weeds, which choke the finer Grasses, therefore on such soils drainage must be provided.

The soil should be rich in plant food, especially that of a nitrogenous character. It is well, therefore, to give the intended site a heavy dressing of

good farmyard manure, and thoroughly dig but not trench it. Enough time should then be allowed for the soil to settle, as it must be firm when the seed is sown or the turf laid, or there will be a series of hills and hollows a few months after. In addition to the organic manure, apply the following mixture at the rate of 3 oz. to the square yard, forking it well into the top spit of soil.

2 lb. superphosphate of lime.
1 lb. bone meal.
1 lb. Peruvian guano, or sulphate of ammonia.
} Mix thoroughly.

If good turf, free from weeds and coarse Grass, can be had, it is more expeditious to lay turf, but as a rule it is the better plan to sow seeds. A longer time must, of course, elapse before a thick, close sward is obtained, but the ultimate results are more satisfactory.

To Lay Turf.—The turves should be cut of uniform thickness, and if about 3′ in length and 15″ in width they will be convenient to handle. For cartage purposes they are best rolled up, grass side inwards. The surface must be raked free from all stones and rubbish, levelled, and made firm. Lay the turves evenly, so that their edges just meet, then spread over a little fine soil, and brush this into the interstices, and apply the turf beater vigorously. The latter is made of a piece of flat surfaced heavy timber, about 1 square, to which is attached a stout Ash handle. In using the beater, the surface of the head must strike the turf evenly at each stroke. The most suitable period for laying turf is the end of September, but the spring season can also be used.

Lawns from Seed.—A thorough preparation of the surface is necessary, before the seed can be sown. First rake off all loose stones, then, if the surface be still lumpy, spread a 2″ layer of fine, light soil, level, roll, and rake again. The best time for sowing is about the beginning of April, for then the soil is beginning to get warm, and the gentle spring rains induce speedy germination. The seed must be procured from a reliable source, otherwise a vexatious crop of weeds will kill out most of the fine Grasses. From 2 lb. to 2½ lb. of seed will be required per sq. rod (30¼ sq. yds.), from 3 cwt. to 4 cwt. per acre. Sprinkle the seed evenly over the surface, and roll repeatedly, each rolling being at right angles to the previous one. When completed, the surface of the newly sown lawn should be quite smooth, firm, and free from all hills and holes.

As a rule it is the best plan to buy a mixture of lawn Grass seeds and Clovers from a reliable firm, stating the position that the lawn is to occupy, whether on high ground and wind swept, or low and sheltered. Special mixtures are required for cricket grounds, where the sward must be close and the Grasses of dwarf and spreading growth, and for golf grounds, where the growth should be erect and springy, so as to lift up the balls.

The following are the Grasses and Clovers usually employed in mixtures :—

Cynosurus cristatus (Crested Dog's-tail).
Festuca duriuscula (Hard Fescue).
Festuca ovina tenuifolia (Fine-leaved Sheep's Fescue).
Festuca rubra (Red Fescue).
Lolium perenne (Perennial Rye Grass).
Poa pratensis (Smooth-stalked Meadow Grass).
Poa trivialis (Rough-stalked Meadow Grass).
Poa nemoralis (Wood Meadow Grass).
Trifolium repens (Perennial White or Dutch Clover).
Trifolium minus (Yellow Suckling).

In addition to the foregoing, the Yarrow or Milfoil (Achillea Millefolium) is much employed, standing the drought exceedingly well, but it is very coarse growing. It is excellent for town villa gardens.

To Keep Lawns in Condition.—Early in the spring, just as the grass begins to grow, the heavy roller should be passed several times over the ground. Worm casts should be broken up when dry, and rolled in. To get rid of worms, which are often a great nuisance, water with clear lime water in the evening, and pick up the dead worms next morning. Where the surface of tennis lawns and cricket pitches shows signs of crumbling, dress in autumn with powdered clay four parts and chalk dust one part. Do not give more chalk than the quantity mentioned or the surface will be greasy in wet weather. Sheep may be turned out to feed upon the lawn in winter; the results are usually excellent. To keep the grass well nourished, dress occasionally with the mixture of artificials previously mentioned, at the rate of 3 oz. to the sq. yard. Or give the same quantity of bone meal. Wood ashes and soot, combined or not, make an excellent dressing. All chemicals, including soot, should be applied during showery weather. If soil poverty is the cause of the mossy appearance, scratch off all the moss in autumn with a sharp-toothed iron rake, dress with a good layer of fine, light soil two parts and wood ashes one part, and sow down a little more seed in spring.

LAWN SAND.

A proprietary preparation intended as a dressing for weedy lawns. It is said to kill all the weeds, and, at the same time, act as a fertiliser upon the finer and close-growing Grasses. There is little doubt that the foliage of broad-leaved weeds is killed, but it is equally true that unless the sand is applied very carefully the Grasses are burnt up as well. Lawn sand should be applied by means of a dredging box; failing this, an ordinary tin with a few small holes punched in the lid will serve. It should only be applied during dry weather. The burning of the foliage of Docks only checks growth for a time.

LAWN-SWEEPING MACHINE.

Amongst the newer mechanical contrivances to assist the gardener is the lawn-sweeping machine, which is of value where long, unbroken stretches of turf have to be swept; but where the grassland is much broken up with shrubberies and specimen trees these machines are of little use. Two sizes are on the market—one requiring horse power, the other to be worked by two men. There are four rotary brushes, which pick up all rubbish and deposit it in a receptacle at the back of the machine. When full, a lever is depressed, a flap is opened, and the rubbish is dropped in a heap. The system is the same as that applied to street-sweeping machines.

LAWSONIA (*syn.* ALCANNA).

(*Ord.* Lythrarieæ). The leaves of alba, powdered and made into a paste, constitute the henna used by Eastern women for dyeing the finger nails orange yellow.

LAYER.

A layer is a shoot that has been subjected to the process of "layering," or laying down, with a view to causing the formation of roots at a definite point, and the ultimate development of the shoot into an independent plant. All layers should, if possible, remain attached to the parent plant until roots are emitted, but when tender subjects are in question, and only a callus has been formed by the allotted time, they may be lifted with a fair amount of safety. Fully 80 per cent. of callused layers may be expected to root subsequent to lifting.

LAYERING.

A method of propagation commonly practised with plants of which cuttings cannot be made to root readily when detached previous to rooting.

Under the head of layering may be placed the various operations known as "tongueing," "ringing," "heeling," and "serpentine arching." These are all variations of the same method, and a common principle is at the bottom of them all.

LAYERING.

a, old plant; *b*, young shoot; *c*, *c*, leaves removed from shoot; *d*, tongue; *e*, peg; *f*, lower soil; *g*, mound of soil.

Briefly, it is this: The sap ascends by the alburnum or sapwood, and descends, after having been elaborated in the leaves, by means of the tissues of the inner bark. By forming an obstruction to the descent of the elaborated sap at any given point, a tendency to root formation is established at that point.

There are many methods of setting up this obstruction. The commonest, and, on the whole, the best, is that of tongueing. To take a familiar instance, the Carnation: The lower leaves are stripped off the shoot to be operated upon until a point is reached where the wood is beginning to get firm. A sharp, thin knife blade is inserted in the stem, just below a joint, and an upward longitudinal cut is made, dividing the stem into halves. The cut passes through the joint, and altogether is about 1″ long. The shoot is bent towards the axis of the parent plant, the tongue is thus opened, bent down, inserted in the soil, and pegged firmly in position. It is imperative that the tongue be kept open, or the wound will heal and roots will not be formed. It is advisable to place a layer of light, rich soil, about 2″ deep, about the plant that is to be layered.

Alternative methods are to simply cut a notch in the stem below a joint, or to remove a ring of bark, taking care, however, not to cut into the sapwood next to the bark. Neither of these, however, is quite so expeditiously performed as tongueing.

Serpentine arching is a term used to describe the layering of rather long shoots that are situated higher up the main stem than those of the Carnation. "Piercing" is another variant, the stem being pierced with the point of a sharp knife or other instrument, and pegged down as before. Layering by inserting the growing point is occasionally done when other methods fail. "Twisting" is an equally uncommon method. The ringing of Dracænas, Crotons, and Aralias follows similar lines, moss, with which the wound is covered, serving as soil.

Layering by circumposition is an ingenious and highly successful plan. To the shoot which has been tongued or ringed a pot full of soil is fixed. The pot is first split in halves, each half being clasped about the stem, and subsequently filled with soil. Strictly speaking, the so-called layering of Strawberries is not layering, because no attempt is made to obstruct the sap flow beyond the slight compression of the stone or peg with which the plantlet is fastened to the soil.

Wire layering pegs may be bought cheaply from the sundriesman, but excellent pegs can be made from an old Birch broom or from the stems of the common Bracken.

LAYIA.

Layias are neat hardy plants (*ord.* Compositæ), principally annuals, and having Daisy-like yellow or white flowers. They are raised from seeds sown in the same manner as other hardy annuals (which *see* for treatment). They grow in common soil in a sunny situation. Seeds sown in August will give plants to bloom in spring.

Principal Species:—

Calliglossa, 1′, Aug., yel. (*syn.* Oxyura chrysanthemoides).
chrysanthemoides, 1′, Aug., yel.
elegans, 1′, Jy., yel., wh; there is a wh. var.
glandulosa, 1′, Jy., etc., wh.
heterotricha, 1′, Jy., etc., wh.
platyglossa, 1′, Aug., etc., yel. (*syn.* Callichroa platyglossa).

LAYING IN.

This term is used in connection with trained trees, and is applied to new growths that have to be trained, or laid in, between branches, the places of which they will subsequently take. It is equally applicable to fruit trees, flowering trees, and shrubs, trained to walls or trellises, and from which old growth is annually removed when it has fulfilled its mission. The same expression is sometimes used to denote a method, in vogue among good gardeners, of roughly and quickly covering with soil the roots of trees, shrubs, and herbaceous plants when received from the nurseryman. This laying in keeps the roots from harm until planting can be properly performed.

LEAF MINERS.

These form a group of pests which are not easy to cope with, as the adult insect pierces the leaf cuticle, deposits an egg, and is gone again quickly. In due course the grub is hatched and bores its way between the upper and lower epidermis, leaving in its train irregular markings that show

Leadwort (*see Plumbago*).
Leather Wood (*see Dirca palustris*).

how freely it has eaten of the leaf substance. To secure immunity from leaf miners in such crops as Celery, Parsnips, Marguerites, etc., preventive measures must be taken, and the best of these is spraying with kerosene emulsion or a quassia solution. Either of these, if sprayed over the foliage at intervals during spring, summer, and early autumn, will make the leaf surface distasteful to the egg depositing insect. (*See also* CELERY FLY, HOLLY LEAF FLY, RAPSBERRY LEAF MINER, and TURNIP PESTS.)

LEAF MOULD.

Leaf mould, or leaf soil as it is sometimes called, is regarded by the successful cultivator as indispensable to the full development of many pot plants, and of the utmost value in the raising of seedlings and cuttings. Young feeding roots of most plants quickly permeate leaf mould, which presents to them a natural and easily assimilable food. The best leaf mould is obtained from the decomposed leaves of deciduous trees, especially Oak, Elm, and Beech. Leaves from evergreen trees do not make good leaf mould. The leaves should be collected as soon as they commence to fall, and a pen should be ready for their reception. The latter should be convenient to the potting shed. When the first frost has arrived it is good practice to turn the mass over into the end of the pen from which the decomposed leaves of a preceding year have been used. By some such method as this a constant supply is secured. It is neither necessary nor desirable to store leaves under a roof, as rain will aid decomposition; but hurdles or wire netting will be needed to prevent newly collected leaves being blown away. Leaf mould is an early form of humus, and when it is remembered that the fertility of soil is largely measured by the percentage of humus (decomposed organic matter) it contains, the value of fallen leaves can be gauged.

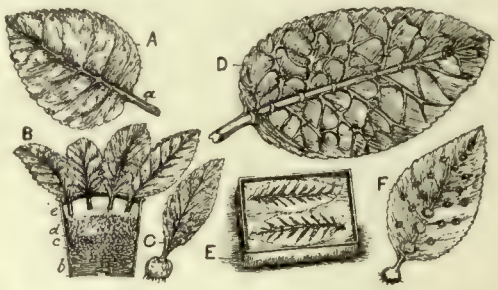
LEAF PROPAGATION.

Propagation by leaves is one of the most interesting phases of gardening art, but it is at the same time a limited one. To the gardener, and especially to the nurseryman, it is of the greatest possible value to know that certain plants may be increased by leaf propagation. Begonias and Gloxinias are the subjects increased most extensively by leaf propagation, and the methods necessary to secure success are described under each head. It should, however, be stated as a general principle that leaf propagation is most easy and profitable in early autumn, when the leaves are fully developed but have not begun to turn yellow.

The commonest method of procedure is to cut through the mid-rib and principal veins and then peg the leaf on the surface of some sandy soil, or on Cocoanut fibre refuse. If soil and atmosphere are kept moist and a brisk heat is maintained, buds will soon form at the cuts, and when these make tiny plantlets, they may be put into small pots of sandy compost and kept under a bell-glass or hand-light in the propagating house until large enough for transference to other pots. Begonias, Bertolonias, Gloxinias, Streptocarpuses, and many Gesnerads can be easily increased in this way.

Almost all succulent plants with distinct leaves, such as Echeverias, Gasterias, Sempervivums, etc., can be propagated from leaves, but when the latter are removed from the parent, they must be laid on a sunny shelf for a few days, until the bases are dry. After this, place them in pans of sandy soil in an intermediate temperature, but do not give water until new growth follows the formation of roots and buds. Bryophyllum calycinum is even more ready to reproduce itself from leaf buds, but in its case the buds are formed along the margins of the leaf. Pinguicula leaves should have their bases just inserted in sand or sandy soil, but obliquely, so that the leaf blade rests on the surface of the soil. Quite a number of Ferns have this reproductive power and consequently are deserving of mention here; all viviparous or bulbiferous fronds, if pegged down on sandy soil and kept moist, will give a large yield of tiny plants; Aspleniums, Woodwardias, Aspidiums, and Fadyenias are especially prolific. The scales that make up a Lily bulb are simply fleshy leaves capable of storing plant food, and attached to a severely shortened stem; if separated and inserted by the base in a sandy compost, and placed in a warm greenhouse, they soon root and produce tiny bud-like bulbs.

It is interesting to note here, that the leaves of



LEAF PROPAGATION OF GLOXINIAS.

A, leaf: *a*, part to be inserted. B, leaves inserted round side of pot: *b*, drainage; *c*, small stones or moss; *d*, rough soil; *e*, fine soil. C, "bulb" from leaf cutting. D, leaf with the midribs notched. E, leaves laid on soil. F, "bulbs" forming.

several plants will root freely enough in a propagating case and remain fresh for a long time, but will never make buds; one of the best examples of this peculiarity is seen in Hoya carnosa.

LEAF ROLLERS.

This title does not apply to the larvæ of any particular genus of insects, but to all such as have the habit of making comfortable tubular dwellings for themselves by rolling up a leaf of the plant they affect. The roll is kept in tubular form by means of silky threads, fixed in place by the larva, as it proceeds with its house building. Under this cover the pests eat away the leaf substance, or suck out the plant juices. The chief leaf rollers are the larvæ of species of Tortrix, but the larvæ of Sawflies and of Gall Midges are sometimes equally guilty. They are difficult pests to deal with when in position, consequently preventive measures—such as the removal of surface soil during winter, to destroy chrysalids, and spraying subjects liable to infestation, during spring and summer, with those insecticides which render the foliage distasteful to the pests—should be adopted. Trees and shrubs infested with leaf rollers may be relieved by sharply tapping the stem and branches, as the larvæ usually come out of the rolls if danger is apparent, and lower themselves to the ground by

slender threads. A sheet laid under the tree or shrub will serve to collect the fallen larvæ, and from it they can be destroyed in any handy way.

LEATHER JACKET.

Several tough-skinned grubs are known as Leather Jackets, but the designation applies more particularly to grubs of the Crane Fly (Tipula oleracea), an insect known to almost everyone under its popular title of Daddy-Long-Legs. The Leather Jacket's depredations are usually confined to members of the Cabbage family, though sometimes it does much damage to lawns. In the latter case heavy and frequent rollings have proved beneficial. In the kitchen garden the pest must be trapped by means of pieces of Potato, Carrot, or Parsnip, hollowed out and buried 2″ or 3″ in the soil among infested crops. A piece of stick attached to each serves to locate the trap and also to withdraw it. Examine the traps frequently, and throw the pests into a bucket of hot brine.

LEAVENWORTHIA.

Hardy annuals (*ord.* Cruciferæ), raised from seeds sown in spring or autumn in any fertile soil.

Principal Species :—

aurea, 4″, Je., ro., yel.

LEAVES.

In their myriad forms, sizes, and colours, leaves add materially to the beauty of the world. They contribute largely to the food supply; afford shelter for man, beast, and bird; they supply the fibre for ropes and cordage; they are the factories wherein may be elaborated a sweet fragrance, a healing medicine, or a deadly poison; to the plant they act as lungs and partly as stomach; while man is indebted to them for the constant purification of the atmosphere. Leaves are organs, developed laterally from the stem or axis of a plant, below its growing point. Though varied in form and arrangement, they are, as a rule, designed so as to present as large a surface as possible to the light. In hot, arid countries, however, where evaporation is so great, leaves are modified and thickened, sometimes reduced to a mere point, so that excessive exhalation of moisture is prevented. Leaves never produce flowers, neither do they grow indefinitely, but having reached full development they fulfil their varied functions, but otherwise do not change until decay, natural or accidental, sets in. In deciduous subjects the leaf-fall is annual and total, each leaf being pushed off by the plant, by the formation of a layer of corky tissue at the junction of leaf stalk and twig. In evergreen plants the old leaves do not fall until new ones have been produced, so that at no time is the plant defoliated. In yet another class of plants, including Palms and Pines, the leaves are persistent, lasting for years.

As has already been hinted, the leaves have many functions to perform, and as they can only perform these properly when fully developed, it is essential that cultivators avoid overcrowding in plant or branch, that light and air are not withheld, and that insect pests and deposits of dirt are prevented from doing harm. All these points must be borne in mind if the largest and finest crops of flowers, fruit, or vegetables are to be obtained. Under the action of light the green chlorophyll granules, which give the leaves their colour, are formed, and it is the green parts (and in a less degree the green stems also) that have the power, during daylight, of chemically breaking up the carbon-dioxide taken in by the pores (stomata) that are plentiful on the under sides of the leaves. This process results in the retention of the carbon for nutrition, the oxygen being allowed to escape; thus the carbonic acid, deadly to and given off by animals, is useful to plants.

Besides being food factories and air purifiers, leaves exhale moisture according to the weather conditions prevailing; by this means the excess of water in the sap drawn up from the earth is given off, the surrounding atmosphere is moistened, and consequently is able to attract and condense other moisture in the air, and in this way ensure those moist, climatic conditions that are the soul of fertility, but which so many countries and localities are forfeiting by the wholesale removal of timber trees, without any attempt at re-afforestation.

Next to humanity itself there is probably nothing so wonderful or so complex as the leaves, and it is difficult to comprehend the high position they hold in the economy of Nature; no chemist so skilled, no factory so ably run, no pump so powerful, and no distiller so clever as the leaves.

LEBECKIA.

Greenhouse shrubs (*ord.* Leguminosæ), propagated by cuttings of half-ripe wood. Soil, loam and peat.

Principal Species :—

cytisoides, 3′, Je., yel. (*syn.* Crotalaria pulchella).
sericea, 4′, Mch., yel. (*syn.* Crotalaria angustifolia).
simsiana, 4′, spr., yel. (*syn.* Sarcophyllum carnosum).

LECANOPTERIS.

Lecanopteris carnosa (*ord.* Filices) is a curious stove Fern. The rhizomes spread out as excrescences over the tree trunks on which the plant grows. Increase is by division and by spores. Soil, sandy peat. The plant should be fixed to pieces of cork.

LECYTHIS.

A genus of about forty species of tropical trees (*ord.* Myrtaceæ), which grow to a considerable height. They have big trunks, large heads of handsome foliage, and peculiarly hooded flowers. Two species are of economic value, Ollaria yielding the Monkey Pot fruits, and Zabucajo producing Sapucaia Nuts; both are stove plants which will grow in good loam and sand, and may be raised from imported seeds.

LEDENBERGIA.

Climbing shrubs (*ord.* Phytolaccaceæ), requiring stove treatment, and propagated by cuttings in very sandy soil. Soil, three parts loam and one part leaf mould. Good drainage is essential.

Principal Species :—

roseo-ænea, 6′, lvs. vio. beneath and metallic grn. above (*syn.* Phytolacca purpurascens).

Lebanon, Cedar of (*see Cedrus*).
Lebretonia (*see Pavonia*).
Lechenaultia (*see Leschenaultia*).
Ledebouria (*see Scilla*).

LEDUM. (Labrador Tea.)

Hardy evergreen shrubs (*ord.* Ericaceæ) that are readily propagated by layers. They grow well in peat and sand, and are very handsome when in flower. Some species once included under Ledum are now referred to Leiophyllum, which *see*.

Principal Species and Varieties :—

glandulosum, 2′ to 6′, Ap., My., wh.
latifolium, 3′, Ap., wh. (*syn.* grœnlandicum).
canadense and globosum are good vars.
palustre, 2′, My., wh.; decumbens is a prostrate form.

LEEA.

Description.—Dwarf stove shrubs (*ord.* Ampelideæ), a few of which are remarkable for the elegance of their pinnate leafage, and the charming arrangement of green, bronze, white, and red in their foliage. The best species is amabilis.

Propagation is effected by cuttings in sandy soil, placed in a close propagating case. A gentle bottom heat must be afforded, and though at all times a moist atmosphere must be maintained, great caution is necessary to prevent damping from over watering.

Soil.—Rich loam, with leaf mould or peat, and sand form a suitable compost.

Principal Species and Varieties :—

amabilis, 3′, lvs. bronze above, with wh. central stripe, dull red beneath; var. splendens is better than the type.
coccinea, 3′, sum., sc., pk.; only species with an attractive inflorescence.

LEEK.

A valuable winter vegetable (Allium porrum), closely related to the Onion, but having a more delicate flavour.

Seed Sowing.—The time of seed sowing is governed by the quantity of plants required. For general purposes a sowing at the middle of March suffices, but where a longer season of supply is sought, sow in February, March, and April. Sow in a seed bed, and transplant when the seedlings are about 6″ high.

Planting.—This should be in well-prepared, rich soil, previously watered if very dry. If small stock for home use is required, make holes about 9″ deep and 8″ apart, with a broom handle, drop one plant in each, fill with water, and leave. The plants will grow and fill the hole, and useful produce is ensured with little labour. For large produce, plant in trenches or on very deep, rich ground, and ensure perfect blanching by wrapping in brown paper, not tied so tightly as to arrest progress.

Other Cultural Points.—The plants left in the seed bed will form small stems the following spring if the flowers are removed; these make an excellent vegetable. The main crops must be thoroughly watered in dry weather, as they are, like Onions, gross feeders, and a check in growth through lack of food often results in tough, strong produce. Leeks are perfectly hardy, and need not, therefore, be lifted and stored for winter; indeed, they are much superior in flavour when drawn as required.

Selection of Varieties :—

Ayton Castle Giant.
Dobbie's Champion.
Musselburgh.
The Lyon.

Ledocarpum (*see Balbisia*).
Lee-chee, or Litchee (*see Nephelium Litchi*).

LEIANTHUS.

Stove shrubs and trees (*ord.* Gentianeæ). Propagation is by cuttings in very sandy soil, beneath a bell-glass, over bottom heat; or by seeds. Soil, loam and peat, both fibrous, with coarse sand. The removal of the plants to a cooler structure for flowering ensures a longer display.

Principal Species :—

longifolius, 2′, Aug., yel. (*syn.* Lisianthus longifolius).
nigrescens, 2′, Aug., blk.
(*syn.* Petalostylis nigrescens).
umbellatus, 24′, My., yel., gru.

LEIOPHYLLUM. (Ammyrsine.)

Hardy evergreen shrubs (*ord.* Ericaceæ), propagated by layers in summer, or by cuttings in very sandy peat. Soil, three parts of peat and one part of leaf mould, with coarse sand.

Principal Species ;—

buxifolium, 1′, My., wh. (*syns.* Leiophyllum thymifolium and Ledum buxifolium).
— prostratum, 1′, Ap., wh. (*syns.* Lyoni and prostratum).

LEMNA.

A small genus of tiny hardy aquatics (*ord.* Lemnaceæ), which float on the water surface and multiply with great freedom. The Duckweed, so well known as a bright green surfacing on stagnant pools and quiet backwaters, is the smallest species —minor. The flowers are minute, set in urn-shaped spathes. Neither minor, polyrhiza, nor trisulca requires any artificial aid in the matter of increase; the difficulty is to repress the Duckweeds.

LEMON (*see* CITRUS MEDICA LIMOMUM).

LENTILS.

The Lentils of sacred history are probably the same as those of the present day, *i.e.* the seeds of Lens esculenta (*syn.* Ervum Lens), a weedy, wing-leaved, annual, Leguminous plant, that is distributed throughout the Orient and is extensively cultivated in many parts of Southern Europe, Egypt, and India. The food value of Lentils is very high, but they have never been very popular in this country, though the makers of patent foods have always been well aware of their value.

LENT LILY (*see* NARCISSUS).

LEOCHILUS.

These are little known, small-growing epiphytic Orchids (*ord.* Orchidaceæ), closely allied to Oncidium. They are best managed in an intermediate house, planted in Teak baskets, in a mixture of sphagnum, fibrous peat, and finely broken crocks. Increase is by division when new growth commences.

Principal Species :—

oncidioides, 6″, aut., wh., pk., pur. (*syns.* Oncidium macrantherum and Rodriguezia maculata).

Other Species :—

carinatus, 4″, aut., or.
cochlearis, 4″, sum., yel.
sanguinolentus, 6″, aut., crim.

Leimanthium (*see Melanthium*).
Leiospermum (*see Weinmannia*).
Lembotropis (*see Cytisus*).
Lemon Bergamotte (*see Citrus medica Limetta*).
Lemon Grass (*see Andropogon*).
Lemonia (*see Ravenia*).

LEONOTIS. (Lion's Ear.)

Rather showy greenhouse herbaceous plants or shrubs (*ord.* Labiatæ), which are propagated by cuttings struck in bottom heat in spring. Soil, a rich loam. Young plants ought to have frequent shifts and to be regularly stopped to induce a bushy growth. They must have plenty of air in summer, and will do outdoors at that season.

Principal Species :—

Leonurus, 5′, win., sc., shrubby (*syn.* Phlomis Leonurus, *see* figure).

Other Species :—

intermedia, 3′, Sep., or. yel.

nepetæfolia, 4′, Sep., or. sc.

Leonotis Leonurus.

LEONTICE.

Interesting little plants (*ord.* Berberideæ), some of which are cultivated as hardy herbaceous plants in warm localities, but are best grown in a cool greenhouse. The roots are tuberous. Propagation, by seeds or offsets. Soil, loam and peat, not very dry at the growing period.

Principal Species :—

Alberti, 8″, Ap., hlf-hdy., br., yel.

darwasica, 8″, Feb., hdy., yel.

Leontopetalum, 1′, spr., yel.; var. vesicaria.

Altaica, Chrysogonum, odessana, and Oliverii are *syns.* of Bongardia Rauwolfii. Thalictrioides is Caulophyllum thalictroides.

LEONTODON. (Hawkbit.)

A rather numerous genus of summer-flowering, hardy herbaceous plants (*ord.* Compositæ), of scarcely any value for gardens. They grow in any common soil, and are increased by division, or by seeds sown in the open in spring. All have yellow, Hawkweed-like flowers, and leaves of similar character to those of the Hawkweeds and Dandelions. Pyrenæus is the best of the species.

LEONTOPODIUM. (Edelweiss.)

The only species of note is a hardy, grey-leaved, herbaceous perennial (*ord.* Compositæ). Propagation, by seeds or spring division, and the plant will grow in any soil. It appears somewhat difficult to establish in some places, but once settled grows readily. It should be well exposed to the sun, and the surface of the soil covered with broken stone.

Principal Species : —

alpinum, 6″, My., Je., yel. (*syns.* L. helveticum, L. vulgare, and Gnaphalium Leontopodium). Himalaicum, sibiricum, and transsylvanicum are vars.

LEOPARD MOTH.

This handsome species (Zeuzera pyrina, *syn.* Z. Æsculi) is distributed throughout Europe and Northern Africa, but has generally been considered somewhat rare in this country. During the past year or two it has, however, been frequently found in the London district and the Southern counties. The perfect female insect measures 2½″ across the forewings, but the male is somewhat smaller. The wings are white, strewn with bluish black spots, and there are three similar spots on each side of the thorax. It is the yellow, black-dotted larva that proves such a pest in gardens and parks, as it tunnels into Apple, Ash, Birch, Beech, Chestnut, Elm, Holly, Lime, Oak, Pear, Walnut, Whitethorn, Willow, and other trees, and sometimes attacks telegraph poles. Being of considerable size, and a rapid worker, it is capable of soon causing the collapse of a large tree, but it betrays itself by the wood dust it leaves at the entrance to its tunnel. As soon as the presence of this wood borer is detected, insert a piece of stout wire into the tunnel, and push it as far as possible, so that the larva may be killed. Hunting the moths by night, during August, should certainly be practised in localities known to be infested.

LEPANTHES.

An extensive family of low-growing stove Orchids (*ord.* Orchidaceæ), allied to the genus Pleurothallus, but as few possess any horticultural merit the genus is only occasionally represented in collections. Pot in fibrous peat and sphagnum, in well-drained receptacles. Though the flowers are minute, the foliage is, in some cases, attractive.

Principal Species :—

calodictyon, 3″, aut., lvs. grn. and br.

sanguinea, 3″, bright red.

tridentata, 3″, sum., pur., yel.

LEPECHINIA.

Hardy herbaceous perennials (*ord.* Labiatæ), propagated by division in spring, or by seeds in a cold frame. Soil, three parts loam and one part peat.

Principal Species :—

clinopodifolia (correctly Mentha dahurica).

spicata, 1′, Jy., yel.; requires protection in win.

Leontodon of Adanson (*see Taraxacum*).
Leopard's Bane (*see Doronicum*).
Leopoldinia pulchra (*see Cocos weddelliana*).
Lepanthus (*see Heteranthera*).

LEPIDIUM.

The two species of note in this genus (*ord.* Cruciferæ) are sativum (*see* CRESS) and latifolium. The latter grows 3′ to 4′, and has white flowers in August. It is hardy.

LEPIDOPTERA.

This is the title of one large natural order of insects, consisting of the two great scale-winged families—butterflies and moths. If a butterfly wing be placed under a high-power magnifying glass the beautiful arrangement of scales that protects such a delicate organism can be seen. The chief differences between butterflies and moths are that the former have club-shaped tips to the antennæ, and frequently have scaly bodies, while the moths have plumed or pointed antennæ, and, mostly, silky hairs on their thick bodies. Both among moths and butterflies there is sometimes a very marked difference between the adult male and female insects. A good example of such difference is seen in the Winter Moth (Cheimatobia brumata), where the male is a fully winged, medium sized individual, but the female is a small, dull brown, and wingless creature. The maggots of butterflies and moths (larvæ) are produced from eggs that are usually deposited where abundant and suitable food will be forthcoming at hatching time; under the comprehensive title of caterpillars the voracious larvæ are far too well known to gardeners. A larva or caterpillar when mature assumes the hybernating form known as a chrysalis, and after wintering in the soil, among fallen leaves, or in some dry, cosy corner, the perfect insect (imago) emerges as soon as the warmth of spring arrives, and, after mating, quickly proceeds to secure the continuity of its species by depositing eggs.

LEPTACTINA (*syn.* LEPTACTINIA).

Stove shrubs from tropical Africa (*ord.* Rubiaceæ). The flowers are pretty. Tetraloba is well worth growing. Propagation is by cuttings in brisk bottom heat, in a close case in spring. Soil, fibrous loam two parts, leaf mould one part, with sand.

Principal Species:—

Mannii, 6′ to 12′, wh., fragrant: the plant has a habit like that of the Randias.

tetraloba, about 2″ across, wh.; of neat and bushy habit.

LEPTINELLA.

A genus of small herbs (*ord.* Compositæ), allied to the Anthemises, and now referred to Cotula; the old name is retained here for cultural purposes. They may be used for carpet bedding, and for covering bare, dry banks, or for carpeting bulbous plants in the borders or rockeries, but otherwise are of little value in gardening. They are propagated by division or seeds in spring, and grow in common soil.

Principal Species:—

dioica, 3″, Je., yel.
lanata, 3″, Je., yel.
plumosa, 6″, Je., yel.
scariosa, 3″, Jy., yel.

Leperiza (*see Phædranassa and Urceolina*).
Lepicystis (*see Polypodium*).
Lepidocarya (*see Parinarium*).
Lepismium (*see Rhipsalis*).
Leptandra (*see Veronica*).
Leptoceras (*see Caladenia*).
Leptochilus (*see Acrostichum*).
Leptocionium (*see Hymenophyllum*).

LEPTODERMIS.

A greenhouse evergreen shrub (*ord.* Rubiaceæ), propagated by cuttings of half-ripened wood. Soil, fibrous loam and peat.

Principal Species:—

lanceolata, 3′, Je., yel.

LEPTOGRAMME.

This genus has now been merged in Gymnogramme by botanists, but L. villosa (correctly G. villosa, *see* figure) is still grown by some Fern lovers under its garden name. It is a graceful Fern, well worthy of attention.

LEPTOGRAMME VILLOSA (*now* GYMNOGRAMME VILLOSA).

LEPTOMERIA.

Greenhouse evergreens (*ord.* Santalaceæ), propagated by cuttings of ripe wood under a bell-glass. Soil, peat and loam.

Principal Species:—

acida, 6′, My., wh.
Billardieri, 6″, My., wh.

LEPTOSIPHON.

Densiflorus is a charming blue and white flowered hardy annual (*ord.* Polemoniaceæ). This is now referred by botanists to Gilia densiflora, but is so well known under the above name as to warrant admission. Seed should be sown in early spring, in any light garden soil. There are many varieties which are very useful for a front place in the herbaceous border.

LEPTOSPERMUM.

Beautiful half-hardy or greenhouse shrubs (*ord.* Myrtaceæ), with Hawthorn-like flowers on slender

Leptodactylon (*see Gilia*).
Leptopleuria (*see Dicksonia*).
Leptopteris (*of Blume, see Gelsemium*).
Leptopteris (*of Presler, see Todea*).
Leptopyrum (*see Isopyrum*)

branches, and very pleasing when in bloom. Some of the species are hardy on the south and south-west coasts of the United Kingdom, but they are best grown indoors. Propagation, by cuttings of young wood in sand under a bell-glass in May, or by seeds sown in March in a moderate heat. Soil, sandy peat and leaf mould.

Principal Species :—

scoparium, 5′, Je., wh. (*syn.* bullatum), lvs. used for tea in New Zealand; var. grandiflorum, wh. (*see* figure).

Other Species :—

Annæ, 6′, sum., wh.
arachnoideum, 4′, Je.
attenuatum, 6′, sum.
flavescens, 5′, Je.
— grandiflorum.
lævigatum, 20′, Je., etc. (*syn.* Fabricia lævigata).
lanigerum (*see* pubescens).
myrtifolium, 8′ to 10′, Je.
pubescens, 5′, Je. (*syn.* lanigerum).

LEPTOSYNE.

Showy hardy or half-hardy annual or perennial plants (*ord.* Compositæ), often included with Coreopsis. They require the same treatment as that genus, and are increased in a similar way.

Principal Species :—

calliopsidea, 1½′, aut., ann., yel.
Douglasii, 1′, aut., ann., yel.
gigantea, 3′ to 6′, aut., hlf-hdy. per.
maritima, 1′, aut., hdy., yel. (*syn.* Coreopsis maritima).

LESCHENAULTIA.

Description.—A genus (*ord.* Goodenovieæ) of greenhouse evergreens, one or two of which are conspicuously beautiful. Like many other hard-wooded plants, they have fallen somewhat into disrepute, but are worthy of the attention of everyone.

Propagation.—By cuttings of the tips of the young growths in sand, or very sandy peat, beneath a bell-glass. Damping must be guarded against.

Soil.—Three parts of good fibrous peat and one part of fibrous loam, with some coarse sand and pieces of charcoal to ensure porosity.

Other Cultural Points.—As soon as the cuttings have rooted, place singly in small pots, these being perfectly drained; indeed, this point must be kept in view at all stages. They do not like full sun in summer, and should have a minimum temperature of 40° in winter.

Principal Species :—

biloba, 1′, My., Jy., bl.
— major, larger flowers, brighter, better grower.

Other Species :—

formosa, 1′, Je., sc. (*syns.* Baxteri and multiflora).
laricina, 1¼′, sum., sc. (*syn.* splendens).

LESPEDEZA. (Bush Clover.)

A genus of hardy, half-hardy, or greenhouse annual or perennial herbaceous plants or shrubs (*ord.* Leguminosæ), little grown in gardens, but likely to be more grown on account of recent introductions. Propagation, the annuals by seed sown in sandy soil in spring; the perennials by seeds and division at the same season; and the shrubs by cuttings in sandy peat and leaf soil under a bell-glass in heat. Soil, loam, peat, and sand.

Leptotes (*see Tetramicra*).
Lesser May Bug (*see May Bug*).

Principal Species and Varieties :—

bicolor, 3′, Sep, ro., pur., shr.
— alba, hdy. shr., wh.
capitata, 2′ to 5′, Aug., yellowish wh., pur. spot.
Delavayi, 3′ to 6′, sum., per. herb, vio.
— sericea, hdy. per.
formosa major, or., red.
macrocarpa, 3′, Aug., hdy. shr., pur.
Sieboldii, 5′, Sep., hdy. shr., pur. (*syn.* bicolor of Hooker *fil. Botanical Magazine*).

Other Species :—

angustifolia, 2′, Jy., hdy. per., pale pur.
eriocarpa, 3′, Jy., hlf-hdy. shr., reddish pur.
polystachya, 3′, Jy., wh.
reticulata, 3′, Aug., hdy. per., vio. pur.
Stuvei, 2′ to 4′, Aug., vio. pur. (*syn.* Nuttallii [not Britten and Brown]).
villosa, 3′, Jy., wh.
violacea, 3′, Aug., hdy., vio. pur.

Photo: D. S. Fish, Edinburgh.

Leptospermum scoparium grandiflorum.

LESSERTIA.

A genus (*ord.* Leguminosæ) comprising annuals, herbaceous and shrubby perennials, all requiring greenhouse treatment. Propagation, by seeds for the annuals, seeds and division for the herbaceous perennials, and cuttings for the shrubby perennials, all in heat. Soil, loam and peat in equal portions.

Principal Species :—

diffusa, 6″, Je., ann., ro., pur.
fruticosa, 1′, Jy., shrubby, pur.
perennans, 1′, Jy., herbaceous, rich lil.
pulchra, 1½′, My., shrubby, red.

LETTUCE.

Description.—A most valuable salad, as judicious cultivation will ensure a supply practically the whole year round. It is derived from the hardy annual Lactuca Scariola, and possesses marked antiscorbutic properties.

Propagation.—By seeds sown either out of doors or under glass at almost any period of the year.

Soil.—Well-worked, rich loam for preference, but good Lettuces can be produced in almost any fertile soil.

Summer Lettuces.—Seeds should be sown under glass during January and February, and the plants subsequently placed on a warm border. From March onwards, outdoor sowings are made, and the best system is to draw shallow drills 1′ apart, disposing the seeds thinly so as to reduce the necessity for thinning. The advantage of this over broadcast sowing is that the thinnings may be utilised for forming other rows, while those that remain will develop into splendid produce. The last sowing for summer Lettuces may be made in July. Though tying is frequently neglected, owing to the time occupied, it is false economy, as, without exception, the Cos varieties are all improved thereby.

Winter Lettuces.—The hardiest varieties are employed for this purpose, notably Hammersmith Hardy Green, All the Year Round, Hicks' Hardy White, and Black Seeded Bath, the first two being Cabbage varieties and the last two Cos. All the Year Round and Bath Cos are the best, the last named being probably the hardiest. August sowings outdoors practically commence the winter crop, and the successional plants must be in frames, some of them to remain for development, and others to have a place on warm borders. The greatest possible amount of air, consistent with safety, must be admitted to the frames, and the soil should be moist. It is not advisable to attempt very rapid forcing, as it will end in failure in many cases, but Cabbage Lettuces force well. One of the best varieties for the purpose is Golden Ball.

Selection of Varieties :—

Cos Section :—

Black Seeded Bath.	Superb Green.
Hicks' Hardy White.	Superb White.

Cabbage Section :—

All the Year Round.	Continuity.
Commodore Nutt.	Golden Ball.

Hardy Varieties :—

All the Year Round.	Black Seeded Bath Cos.

Lettuce Fly.—Fortunately this pest (Anthomyia Lactucæ) is not much known to gardeners, because it does not commence its attacks until the plants begin to flower. It is the seed grower who suffers most from the Lettuce fly. Eggs are deposited on the flowers, and the larvæ bore into and destroy the seeds as they mature. Some system of spraying just before the flowers expand would probably save the crop, but this is seldom done, and the safe plan of uprooting and burning badly infested stocks is followed. The Lettuce fly resembles the Onion fly and Cabbage fly in form, but the male is black, with light stripes, and has a dull brown head; while the female is greyish, with conspicuously black legs.

LEUCADENDRON. (Silver Tree.)

Very pretty shrubs or small trees (*ord.* Proteaceæ) now seldom found in cultivation, but adapted for the greenhouse or conservatory. The dried leaves of argenteum, the most ornamental species, are imported in great numbers from the Cape, and are much used, because of their silvery appearance, for wreaths and other ornamental purposes. Propagation, by cuttings of the young tips under a bell-glass in May, in sand. Argenteum, however, is raised from seeds, and can only be grown successfully for any length of time where the air is particularly pure. London fogs have been responsible for the death of many plants. They require a greenhouse temperature and a compost of fibrous peat and a little loam, with a few pieces of charcoal.

Principal Species :—

argenteum, 15′, Aug., yel., foliage silvery.

Other Species :—

ærnulum, 4′, Jy., yel.
angustatum, 4′, Je., yel.
cinereum, 3′, Je., yel.
corymbosum, 4′, Ap., yel. (*syn.* Protea corymbosa).
fusciflorum, 3′, Je., pale pur. (*syns.* stellare and Protea fusciflorum).
grandiflorum, 4′, Ap., yel.
plumosum, 4′, Jy., yel.
sericeum, 3′, My., yel.
tortum, 5′, small oblique lvs.

LEUCERIA (*syn.* Leucheria).

Greenhouse annual or perennial herbs (*ord.* Compositæ) closely related to the Chaptalias. Of the twenty-five species comprising the genus only one, runcinata, 1′, June, white and pink, fragrant, needs mention. It may be treated as a half-hardy annual, and will flourish in warm spots in any ordinary soil. (*Syns.* Chabræa rosea, C. runcinata, Lasiorrhiza rosea, and L. runcinata.)

LEUCHTENBERGIA.

A greenhouse succulent (*ord.* Cacteæ), closely allied to Echinocactus, and needing similar treatment. The only species is Principis, 1′, June, yellow.

LEUCOCARPUS.

A small genus (*ord.* Scrophularineæ). The only species of note—alatus, 2′, summer, yellow—is a half-hardy perennial that requires winter protection. Propagation, by division when growth commences in spring. Soil, loam and leaf mould, with coarse sand.

LEUCOCORYNE.

Pretty little half-hardy bulbous plants (*ord.* Liliaceæ), cultivated like the Ixias (which *see*). They resemble the Brodiæas in appearance.

Principal Species :—

alliacea, 9″, Je., lil. or wh.
ixioides, 1′, Aug., bl. or wh. (*syns.* odorata, narcissiflora, purpurea, etc).

LEUCOJUM. (Snowflake.)

Charming bulbous plants (*ord.* Amaryllideæ) of much value for the garden, and highly prized for cut flowers. The sub-genus Acis, now included with Leucojum by botanists, is described under Acis. Propagation, by offsets removed when the leaves become yellow, and by seeds sown when ripe, either in the open or in pans in frames. Seedlings are several years before they bloom. Soil, light, rather sandy loam for the spring-flowering species, but a moister and heavier one for the forms of æstivum, which in some places thrive as semi-aquatics.

Principal Species and Varieties :—

æstivum, 1½′, Ap., My., wh.; flowers larger, lvs. broader than those of pulchellum, and blooms a little later.
hyemale, 6″, Ap., frame, wh. (*syns.* nicæense and Acis hyemale).
pulchellum, 1½′, Ap., wh.

Lettuce, Lamb's (*see Corn Salad*).

Leucadendron (*of Salisbury, see Leucospermum*).
Leucadendron (*of Linnæus, see Protea*).

vernum, 6″ to 12″, Mch. wh. (*syn.* Erinosma vernum).
— carpathicum, yel. spots instead of grn.
—Vagneri, generally more than one flower on stem.

(Autumnale, longifolium, roseum, tingitanum, and trichophyllum are described under Acis.)

LEUCOPHYLLUM.

Three species of dwarf, branching, greenhouse shrubs (*ord.* Scrophularineæ) covered with silvery wool, and bearing relatively large and showy violet purple flowers. Texanum, 2′ to 8′, spring and summer, the only species yet introduced, may be raised from seeds and cuttings, and likes a fairly rich, loamy soil.

LEUCOPOGON.

An Australian genus (*ord.* Epacrideæ) of evergreen shrubs requiring greenhouse treatment. Propagation is by early summer cuttings of firm tips in sandy peat beneath a bell-glass. A compost of fibrous loam and peat, with sand and charcoal, suits.

Principal Species :—

lanceolatus, 10′, My., wh. (*syn.* Cunninghamii).
Richei, 6′, My., wh. (*syns.* parviflorus and polystachys).

Other Species :—

collinus, 6′, My., wh.
obovatus, 1′, My., Je., wh.
striatus, 3′, Je., wh.
virgatus, 1½′, Je., wh.

LEUCOPSIDIUM.

A small genus of hardy, or nearly hardy, annual or biennial plants (*ord.* Compositæ), which may be increased by seeds and delight in a warm, rich soil and a sunny position.

Principal Species :—

arkansanum, 1′ to 2′, sum., wh., pur., yel.
ramosissimum, 4″ to 12″, sum., vio, yel., compact.

LEUCOSPERMUM.

Greenhouse evergreen shrubs (*ord.* Proteaceæ) that are not common in gardens. Propagation is by cuttings of ripe shoots beneath a bell-glass. Soil, three parts of light loam and one part of fibrous peat, with coarse sand.

Principal Species :—

ellipticum, 3′, Je., yel.
formosum (correctly Protea formosa).
tomentosum candicans, 2′, Aug., yel.

LEUCOTHOË.

Hardy shrubs (*ord.* Ericaceæ). Propagation is by layers in late summer, or by seeds sown in sandy soil under hand-lights as soon as ripe. They grow best in sandy peat.

Principal Species :—

axillaris, 3′, My., wh. (*syn.* Andromeda axillaris).
Catesbæi, 3′, My., wh. (*syns.* spinulosa, Andromeda Catesbæi and A. spinulosa).
Davisiæ, 4′, sum., wh. (*syn.* Lobbi).
racemosa, 6′, My., wh. (*syns.* spicata, Andromeda paniculata, A. racemosa, A. spicata, and A. tomentosa, and Lyonia racemosa).
recurva, 2′, Je., wh. (*syn.* Andromeda recurva).

LEUZEA.

Hardy herbaceous perennials (*ord.* Compositæ). Propagation is by spring division and by seeds. The plants flourish in any fertile soil.

Leucolæna (*see Xanthosia*).
Leucostegia (*see Davallia*).

Principal Species :—

altaica, 8″, Jy., pur.
conifera, 8″, Aug., pur.
salina, 10″, Jy., pur.

LEVELLING.

An operation requiring skill, and which, in extensive work, should be entrusted to an expert. A theodolite is commonly used, and is valuable for ascertaining the rise and fall of the ground. For limited areas a straightedge, spirit level, and borning rods are employed. In addition to these, numerous pegs are used at frequent intervals. The level is often taken from the house, and having been ascertained, a peg is driven in to the proper height; another is inserted 8′ or 9′ away, its

Lewisia rediviva (*see p.* 12).

precise height being determined by the aid of the straightedge and spirit level. Other pegs follow over the surface, and the actual levelling proceeds. The operator must guard against piling good soil in some positions, and leaving the subsoil exposed in others. The surface soil should be carefully preserved, filling low spots with the poorer subsoil from the higher ground. Thoroughly loosen the subsoil before surfacing with 9″ or 10″ of good mould, the whole being subsequently made equally firm.

LEVELS.

Plane surfaces that are parallel to the surface of water are frequently spoken of as "levels," and the same term is applied to those instruments which a surveyor or gardener uses when creating either a horizontal or an inclined plane. The "spirit level" is too common an object to need description, and when it is fixed in a long and rigid straightedge it is a convenient tool for levelling small areas, as the air bubble, being much lighter than the spirit,

quickly indicates the higher end of the instrument by rising towards it. "Borning rods" are made like T squares, 4′ in height, and are used in threes. In use they are held a few yards apart, one having its base on a point to which the surrounding area has to be levelled; the other two are raised or lowered until, viewed from the first one, all the three horizontal cross pieces have their upper edges perfectly in line. The rod to use in the centre should be of a different colour from the other two. The centre rod is the one to raise or lower to get the level between two outside points. Other levelling instruments are made by a combination of the straightedge, a right-angled triangle, and a plummet. There is also the theodolite, an expensive combination of spirit levels, graduated circles, and telescope, used for extensive engineering operations.

LEWISIA.

Beautiful little plants (*ord.* Portulaceæ) for rockwork, and growing in a soil composed of loam, leaf mould, and sand, with a little brick rubbish, in a sunny position with thorough drainage. Propagation, by seeds, sown under glass in spring, or by division at the same time. Rediviva has been known to revive in a herbarium after being dried as a specimen. The Lewisias should be well supplied with water when growing. Tweedyi will be best in a frame in winter.

Principal Species :—

rediviva, 4″, sum., ro. (*see* p. 11). Aug., pk. lvs., bronze reverse.
Tweedyi, 4″ to 6″, Je. to

LEYCESTERIA.

Description.—A handsome hardy shrub (*ord.* Caprifoliaceæ), with bunches of white and purple flowers on rather pendent branches. These are followed by small fruits, which are said to be appreciated by game, and the shrub is sometimes recommended as a covert plant. It is very handsome in the garden or shrubbery, where it will grow in either a sunny or shady place.

Propagation.—By seeds, sown in the open or in a frame in spring; by cuttings of the old wood under a hand-light in autumn; also by cuttings of young shoots under a bell-glass in spring.

Soil.—Common soil.

Only Cultivated Species :—

formosa, 6′ to 8′, sum., wh., pur. (*syn.* nepalense). — variegata, a pretty form.

LEYSSERA.

Greenhouse evergreens (*ord.* Compositæ). Propagation is by cuttings of half-ripe wood in very sandy peat. Soil, loam and peat, both fibrous, with coarse sand.

Principal Species :—

capillifolia, 8″, Je., yel. gnaphaloides, 2′, Aug., or. yel.

LHOTSKYA.

Greenhouse evergreens (*ord.* Myrtaceæ). Propagation is by cuttings in very sandy soil beneath a bell-glass. A compost of loam, peat, and sand suits.

Principal Species :—

acutifolia, 1½′, Je., yel. ericoides, 3′ to 20′, Je., wh. (*syn.* hirta).
violacea, 1½′, Je., vio.

LIABUM.

Herbaceous or shrubby plants (*ord.* Compositæ), scarcely ever met with, and hardly, if at all, procurable from trade sources. The herbaceous species are propagated by division in spring; the shrubs by cuttings of the young shoots under a bell-glass in spring in bottom heat. Soil, loam, leaf mould, and a little peat and sharp sand.

Principal Species :—

Brownei, yel., st. Alpine, yel. (*syn.* Paranephelius uniflorus).
uniflorum, 6″, hlf-hdy.

LIATRIS. (Blazing Star. Button Snake-root.)

Description.—Handsome and effective border plants (*ord.* Compositæ), with long spikes of flowers, which open from the summit of the spike downwards in succession. The greater number are hardy in suitable soil.

Propagation.—By division of the roots in spring, or by seeds sown under glass in pots or in a frame at that season.

Soil.—Liatrises should have a light, sandy soil, but ought not to suffer from drought at the growing period, or the size of the spikes will be much reduced. Pure sand is recommended by some growers, but it must not be dry.

Principal Species :—

pycnostachya, 4′, Aug., pur. One of the finest, but often short lived. scariosa, 3′, Jy., Aug., pur. A distinct species.
spicata, 2′ to 6′, Aug., pur. Very pretty.
— montana, 2′.

Other Species :—

acidota, 2½′, Aug., pur.
cylindracea, 1′ to 3′, Aug., pur. (*syn.* graminifolia, of *Willdenow*).
elegans, 4′, Jy., pur.
graminifolia, 3′, Aug., pur. (not of *Willdenow*).
— dubia.
punctata, 3′, Aug., pur.
squarrosa, 2′, Aug., pur.

LIBERTIA.

Description.—Very ornamental hardy or half-hardy plants (*ord.* Irideæ), which are prized because of their pretty, Iris-like, narrow leaves and their pleasing white or bluish flowers. In some places formosa, grandiflora, and ixioides are not quite hardy, and should have a little protection in winter.

Propagation.—By division in spring, or by seeds sown at that season, and the seedlings wintered in a frame or cool house.

Soil.—Light, dry soil in a sunny position.

Principal Species :—

formosa, 1½′, My., wh.
grandiflora, 3′, Je., wh.
ixioides, 3′, Je., wh.
paniculata, 1½′, hlf-hdy., My., wh.

Other Species :—

cœrulescens, 2′, hlf-hdy., pale bl.
elegans, 1½′, Ap., wh.
pulchella, 1′, Ap., hlf-hdy., wh.
tricocca, 1′, hlf-hdy., wh.
tricolor, 1′, hlf-hdy., wh.

LIBOCEDRUS.

Description.—Ornamental evergreen trees (*ord.* Coniferæ), of which about six species are in cultivation. The majority require the protection of a cold greenhouse in winter, except in very favoured localities. In general appearance they closely resemble the Chinese Arbor-Vitæ (Thuya orientalis), differing principally from that plant in having unequally winged seeds, valvate scales to the cones, and by producing only one seed at the base of each scale.

When growing under natural conditions the trunks of several species rise perfectly erect to a height of over 100′, and are proportionately thick. Most of the species produce very good timber, which is largely used for spars, building material, and various other purposes. From the fragrant odour emitted by the wood the popular name of "Incense Cedar" has arisen.

Propagation.—This is best effected by means of seeds sown as soon as possible after they are thoroughly ripe, in sandy soil indoors, removing the seed pans to a cool, airy frame as soon as germination takes place. Cuttings inserted in sandy soil and placed in a close case in July or August will also root.

Soil. — A cool, rich, fairly light soil, retentive of moisture, is to be commended.

Other Cultural Points. — Keep the plants shapely and free from dead wood, and the surrounding ground free from grass and weeds.

Principal Species and Varieties :—

chilensis, 80′, elegant habit, hdy. in many places (*syn.* Thuya chilensis).
decurrens, 100′ to 150′, hdy., lvs. grn., fastigiate habit (*see* figure).
— aureo-variegata, lvs. golden.
— compacta glauca.
doniana, 70′, hlf-hdy., lvs. grn., spreading head.

Other Species :—

Bidwillii, lvs. narrower than doniana, grh.
macrolepis (*syn.* Thuya tetragona).
tetragona, 80′.

Photo : Cassell & Company, Ltd.

Libocedrus decurrens.

LIBONIA.

A genus of greenhouse or stove shrubs (*ord.* Acanthaceæ) which the *Genera Plantarum* refers to Jacobinia; while other authorities retain the generic title for the two plants named below. The plants are handsome when in flower, and may be used for conservatory decoration; when making growth a warmer temperature is essential. Propagated by cuttings in March under a bell-glass. Keep the plants sturdy by growing them close to the glass, or much beauty is lost. Soil, two parts fibrous loam, one part leaf mould, with decayed manure and sand.

Only Species and Hybrid :—

floribunda, 2′, win., yel. penrhosiensis, 2½′, win., crim.; hybrid.

LICHENS.

Among the lowliest plants are the Lichens; most ubiquitous, most familiar, yet least known, and at the same time most wonderful. The dry greyish green matter that seems to form, rather than grow, upon the stone parapet of a bridge or an old Oak fence; the dead-looking, scabby film that encrusts the broken rock high up the mountain; the scant vegetation that beneath the Arctic snows provides food for the Greenlander's reindeer; and the pretty tasselling that hangs all too freely from the boughs in many a damp orchard and Larch wood, are alike members of the great Lichen family. Physiologically, the Lichens are remarkable for the wonderful example of symbiosis they present — a dual alliance between fungi and algæ. In this extraordinary partnership the fungal hyphæ envelop and protect the algal cells, which manufacture the food for both. Propagation is by spores from the fungoid portion, and by division of the algal cells. Both can live apart, but when together form the Lichen. Lichens have some economic value, as in the case of Reindeer Moss, and Litmus, the latter being a pigment obtained from Roccella tinctoria. In many parts of this country Lichens are injurious, as they form freely upon the trunks and branches of orchard trees, and impede growth. The remedy is found in a winter dressing of caustic soda and commercial potash, coupled with a more liberal system of culture. The dressing is made by dissolving ½ lb. of Greenbank's 98 per cent. caustic soda, and ½ lb. of commercial potash, carefully in separate vessels, subsequently combining the two and adding water to make 5 gallons. Apply in the form of spray, using thick gloves to protect the hands, and a long brass branch to prevent any spray from falling on to and injuring the worker's face. Spraying with strong Bordeaux Mixture, and dusting the branches, when damp, with lime, are further remedies.

LICUALA.

A genus of handsome and rather dwarf Palms (*ord.* Palmæ), almost all natives of the East Indies. A

stove temperature (60° minimum) and moist atmosphere are essentials to full development, indeed, some of the best examples are very often grown during the summer months with the lower part of their pots in a tank of warm water. Rich, substantial, but porous loam is a good rooting medium. Seeds should be sown in shallow pans or singly in small pots and plunged in a brisk bottom heat.

Principal Species :—

grandis, 10′, Feb., grn., yel.
Jeannencyi, 6′; very compact grower, new.
peltata, 6′, sum., wh., yel.
spinosa, 8′, spr., wh., grn. (*syn.* horrida).
Veitchii, 6″ to 10″, stem slow growing ; new.

Other Species are acutifida, amplifrons, elegans, Muellerii, Rumphii, and ternata ; from stems of the first named the celebrated "Penang Lawyers" (walking-sticks) are made.

LIDBECKIA.

Greenhouse shrubs or sub-shrubs (*ord.* Compositæ) of low stature, and of little decorative value. They may be propagated by cuttings in sandy peat under a bell-glass, and like a compost of peat and loam in equal parts, with sand.

Principal Species :—

lobata, 1′ to 2′, My., wh., lvs. silky (*syn.* Cotula quinqueloba).
pectinata, 2′ to 3′, My., Je., wh., like an Oxeye Daisy.

LIETZIA.

A perennial stove plant (*ord.* Gesneraceæ) that is best grown in a mixture of loam, leaf mould, and sand. Increase is by cuttings, seeds, or tubers, giving bottom heat in each case.

Only Species :—

brasiliensis, 1′, sum., grn., pur. br.

LIFTING.

The work of harvesting root crops consists, in the first place, of removing such crops from the soil. This is technically known as "lifting," and, as a general rule, it should be performed when top growth has died down or shows signs of having fulfilled its functions. The same term is also used in connection with the removal of trees, shrubs, etc., from nursery rows ; thus autumn and early winter, when deciduous subjects have lost their foliage, is said by nurserymen to be "lifting-time."

LIGATURES.

Ties or ligatures used in training plants or in securing them to stakes so as to prevent injury by wind, etc., should be of such a kind as to fulfil the purpose intended, but at the same time they must not be drawn so tightly as to check or strangle growth. A favourite method in the case of young trees or shrubs is to pass a piece of cloth or sacking round both stem and stake and tie firmly over this with tarred cord ; such ligatures should be renewed once a year. A common form of ligature is to pass the cord once completely round the supporting stake and bring the plant into position by means of the loose ends. Another is to pass the cord behind the stake, and cross the two ends between stake and plant before the latter is tied in ; when complete, this ligature forms a figure 8, with the stake in one, and the plant-stem in the other loop. In either case the plant is kept firm, but there is sufficient play to allow natural expansion. Ligatures are made in several ways and also with a variety of materials, such as wire (not recommended), tarred twine, raphia, and bast, while in the more delicate operations of budding and grafting, raphia, soft string, or coarse worsted is used.

Lichtensteinia (*see Ornithoglossum*).
Liebigia (*see Chirita*).
Lievena (*see Quesnelia*).
Ligeria speciosa (*see Sinningia speciosa*).

LIGHT.

To ensure robust health and fruitfulness ample light is needed by all plants, excepting some fungi. Artificial light, notably that produced by electricity, will enable plants under its influence to elaborate food just as they would under solar light, but possibly in a less degree ; this has been proved in the United States, where large crops of Lettuces grown under glass are illuminated at night by arc light, and are marketable several days in advance of crops depending solely upon sunlight. Longer lived plants would doubtless soon suffer from exhaustion if under the influence of light the whole of each twenty-four hours. Light is necessary for the production of chlorophyll—the green colouring in leaves and stems—without which the work of breaking up carbonic acid gas into carbon and oxygen, giving off the latter and converting the former into starch, for food, could not be accomplished (*see* LEAVES). It will thus be readily understood that the overcrowding of plants in a greenhouse, shrubbery, etc., or of branches in a fruit tree, is very bad, as in each case light is more or less excluded, and weak growth is the consequence. It is most essential that the glass used on all plant houses and frames should be of good quality, and that the houses be built so as to command as much light as possible. It is also necessary that the glass be kept clean, especially during autumn, winter, and spring, for while it may be necessary to shade some classes of plants from the brightest summer sunshine, there is never too much light during winter. To properly ripen fruits, solar light is essential, and in most cases increase of colour and sweetness are secured if the foliage be drawn back so as to expose the crop—this does not, however, apply to Grapes under glass. Plants in dwelling rooms generally suffer as much from lack of solar light as from impure atmosphere. Most Ferns prefer subdued light ; but green glass, that once appeared likely to become popular for ferneries, is not to be commended ; it is only needed that sufficient shade be given to break up the more direct and brilliant light rays. Attenuated growth and pale foliage are due to deficiency of light, while blanching is secured by excluding light.

LIGHTFOOTIA.

A South African genus (*ord.* Campanulaceæ) of dwarf evergreen plants that are nearly hardy, needing only greenhouse protection. Pot in sandy loam and peat. Propagation is by cuttings of young growth, in fine, sandy peat, under a bell-glass.

Principal Species :—

tenella, 10″, Jy., hdy. in South England, bl. (*syns.* ciliata and Loddigesii and Campanula tenella).

Other Species :—

oxycoccoides, 6″, Jy., bl.
subulata, 4″, Aug., bl.

Lights (*see Frames*).

LIGNUM-VITÆ.

This name, meaning "wood of life," was given long ago to the dark-coloured, dense, and hard heart-wood of Guaiacum officinale, in reference to its durability. The tree is a small one, and found in tropical America. For pulley blocks, pestles, rulers, etc., Lignum-Vitæ is extensively used.

LIGULARIA.

A small group of hardy, yellow-flowered perennials (*ord.* Compositæ) that are now referred to

Photo: Cassell & Company, Ltd.

LILAC MARIE LEGRAYE (*see p.* 16).

the genus Senecio. They succeed in light soil, and are easily increased by cuttings under a hand-light, from seeds, or by division.

Principal Species :—

Hodgsoni, 3′, Je., yel. macrophylla, 4′, Jy., yel.

LIGUSTRUM. (PRIVET.)

Description.—A large genus of mostly hardy evergreen or deciduous shrubs (*ord.* Oleaceæ), found in Europe, Asia, and Australia. They are characterised by having opposite, usually more or less oval, leaves, a bushy habit, and panicles of white or cream coloured flowers. The majority of the species are useful subjects for the garden or shrubbery, and vulgaris and ovalifolium form two of the most useful hedge plants, growing well in almost any situation and under adverse circumstances. The golden variety of ovalifolium is one of the prettiest of hardy, ornamental-leaved shrubs, and is now largely used for isolated specimens, beds, groups in shrubberies and for hedges, and in all cases behaves in a satisfactory manner. It is a first-rate town plant. Ibota, japonicum, lucidum, Quihoui, and sinense make really good, late summer and early autumn flowering plants, and are worthy of extended cultivation.

Ligustrina amurensis (*see Syringa japonica*).

Propagation.—Cuttings of most of the species, from 9″ to 12″ in length, taken in autumn and winter, root readily in a border out of doors or in a cold frame. Coriaceum, japonicum, and lucidum are more difficult to root, and succeed best if taken in July and inserted in sandy soil in a close case indoors.

Soil.—Almost any soil is suitable.

Other Cultural Points.—As most of the species make large, mat-like masses of fibrous roots, which spread for a considerable distance beyond the radius of the branches, it is advisable not to plant very close to slower-growing, choicer shrubs, and it is also desirable to annually cut through the roots with a spade at a reasonable distance from the stem, so as to keep them within bounds. Frequent pruning with the stronger growers is necessary. When used for hedges, the two species previously mentioned—which, by the way, are more often spoken of as Privet than anything else—should be used separately. Good, bushy plants, 2½′ high, should be selected and planted 1′ apart in a single row; if an exceptionally wide hedge is required, a double row may be made. Privet hedges must be kept cut hard back, at least two clippings a year being necessary. The variegated form of the oval-leaved Privet is now grown as bushes and standards for decorative work in winter.

Principal Species :—

Ibota, 6′ to 8′, Aug., Sep., wh.; a good flowering species of thick, bushy habit (*syns.* amurense of gardens, ciliatum, obtusifolium, regelianum, Roxburghii of gardens, and Stauntoni).

ovalifolium of Hassk, 15′, sum., wh. (*syns.* amurense of Carr., ovatum, and reticulatum of gardens). Oval-leaved Privet.

— foliis aureis.

Quihoui, 6′ to 8′, Aug., wh. (*syn.* brachystachium).

sinense, 10′ to 12′, Jy., wh., (*syns.* chinense, Fortunei, frondosum, villosum).

Other Species and Varieties :—

coriaceum, 5′, sum., wh. (*syn.* lucidum coriaceum).

insulare, 6′, Jy., cream (*syns.* angustifolium, insulense, linearis, and longifolium).

japonicum, 3′ to 8′, Jy., wh. (*syns.* bullatum, glabrum, kellerianum, lucidum of gardens, macrophyllum, Roxburghii, and Sieboldi).

lucidum, 12′, Aug., wh.

— Alivoni.

— aureo-variegatum.

— tricolor.

medium, 5′, Jy., wh.

strongylophyllum, 3″ to 24″, sum., wh.; a curious-growing shrub.

vulgare, 6′ to 12′, sum., cream; there are several vars., of which the following are the best: aureum, buxifolium, glaucum, italicum variegatum. Common Privet.

Walkeri, 6′ to 8′, sum., hlf-hdy., wh.

LILAC.

The popular name applied to various species of Syringa (*ord.* Oleaceæ). The species to which the term is most often applied are persica and vulgaris, the former a dwarf, free-flowering shrub, 3′ to 5 high, the latter well known to everyone by reason of its large panicles of fragrant white or lilac flowers,

which are borne in early summer. Of the common Lilac a great number of varieties now exist, some bearing single, others double, flowers, while the panicles of many are very large. In addition to being one of the very best of hardy flowering shrubs and one of the most easily managed, it is also one of the most useful for forcing, pure white Lilac in the winter always being in demand and usually commanding a good price. Although one of the most common and easily managed shrubs, attention to pruning must be given if the best results are required. The centre of the plant should always be kept open to admit light and air, shoots from the rootstock should be removed, and those on the upper branches thinned in early summer. It is also advisable to remove the old flower heads as soon as flowering is over; if left on they weaken the bushes. (For other particulars, *see* SYRINGA.)

Good Varieties:—

alba grandiflora, wh.
Charles X., lil.
Gloire de Moulins, lil.
lemoineana flore pleno, double.
Mdme. Lemoine, double, wh. [*p.* 15).
Marie Legraye, wh. (*see*
Philemon, lil.
Princess Camille de Rohan.
Rubra de Marly, red.
Souv. de L. Späth, rich lil.
Ville de Troyes, lil.
Virginalis, wh.

A GOOD CLUMP OF LILIUM AURATUM (*see p.* 18).

LILIUM. (LILY.)

Description.—The Lilium (*ord.* Liliaceæ) in its many forms is one of the noblest and most beautiful of all bulbous plants, and its cultivation cannot be too strongly advised, although a considerable number of the species are difficult to cultivate, from causes which are obscure, but which probably arise from the absence or presence of moisture at the proper times.

Propagation.—Liliums are propagated by offsets,

detached from the parent when it is at rest; by bulbils, which are produced on the stems of some of the species; and by scales of the bulbs taken off with a portion of the base and placed upright to a depth of about a third of their height in a mixture of Cocoanut fibre refuse, or leaf soil and sand, in pots or boxes, when the bulbs arrive, or when they can be lifted. Keep the scales free from frost, and water very carefully. About the month of May, plunge the pots or boxes in the open, and green shoots will spring from the base, small bulbs eventually forming. These can be grown on, either in boxes or in beds of soil. Liliums are also raised from seeds, sown either in pans or pots when ripe, or as soon as obtainable, and grown on until they are large enough to remove, which will be in about three years. They may also be sown in the open. Seedlings generally require from five to ten years from seed before blooming, but much depends upon the treatment.

Photo: Cassell & Company, Ltd.

LILIUM HANSONI (*see p.* 18).

Soil.—For all practical purposes, Liliums can be grown under one or other of the conditions shown in the following arrangement, which embodies the experience of the most practised cultivators of the flower. The number appended to the description of each Lilium corresponds with that attached to the respective class.

(1) Peat-loving Liliums. These may have about three parts of peat to one part of sand, mixed with ordinary garden soil. They like partial shade, with moisture at the roots, but should not have the bulbs themselves in a bog.

(2) Easily grown Liliums. These will grow in any good garden soil, lightened with leaf mould if heavy, or with the addition of some good loam if light.

(3) Loam-loving Liliums. These may have a deeply dug, fertile loam, which, if of a clayey nature, may be lightened with leaf mould and sand.

Other Cultural Points:—

Liliums in the Open Ground.—As a general rule, Liliums thrive best in positions where they are partially shaded from strong sun and sheltered from cold spring winds. The open places among evergreen shrubs form capital positions for the greater number. This partial shade is especially necessary in the case of those which make roots at the base of the stems. They should not, however, be absolutely overhung with trees. Early planting cannot always be practised, on account of the time at which imported bulbs arrive, but they should not be any longer out of the soil than can be avoided, and such Lilies as candidum must be planted as early in autumn as possible. Dig the soil to a depth of 1½′ or 2′, and plant the

larger-growing species from 6″ to 10″ below the surface; the smaller from 3″ to 4″ deep. As growth is made, the plants ought to be secured to stakes, and when making growth they must have plenty of water. Among the easiest to grow are Batemanniæ, candidum, chalcedonicum, croceum, excelsum, Hansoni, Henryi, Martagon (type), monadelphum, pyrenaicum, elegans varieties, tigrinum varieties, and umbellatum varieties.

Photo: Cassell & Company, Ltd.

LILIUM ELEGANS (*syn.* THUNBERGIANUM) ORANGE QUEEN.

Cultivation in Pots.—Liliums make splendid pot plants, and almost all may be thus grown, although it is hardly advisable to trouble with the commoner species under glass. Mr. R. Wallace, one of the best authorities, recommends a soil of two and three-quarter parts friable loam, and one-third of leaf soil, with a slightly stiffer compost for those which make stem roots. Deep pots are preferable, and sufficient space ought always to be left above to permit of top-dressing with some good soil. Plunge the pots in a cold frame, and bring inside as required. Lilies in pots must be kept cool at the roots, shaded, and should have plenty of air, without draught. Syringing when in growth is also beneficial.

Diseases.—Of the many diseases to which Liliums are liable, the mildew, a Botrytis phase of Sclerotinia, is most to be dreaded, and prevention is more useful than attempted cure. "Veltha" may be used with advantage, and Mr. G. Massee recommends planting the bulbs in sand mixed with a little sulphur, and top-dressing the beds, after removing the surface soil in autumn, with fresh soil to which a little kainit has been added. Candidum is peculiarly subject to fungus, and some recommend lifting the bulbs, and placing them for a time in bags filled with flowers of sulphur. Auratum and speciosum are sometimes attacked by Rhizopus necans. This is the Lily disease which causes so much trouble in imported bulbs. Mr. Massee recommends soaking bulbs for export in a 1 per cent. solution of salicylic acid for twenty minutes.

Principal Species, Hybrids, and Varieties:—

auratum, 4′ or more, sum, wh., yel., pur.; perhaps the most beautiful of all (*see p.* 16). Good vars. are platyphyllum, virginale, rubro-vittatum, tricolor, and Wittei; 3. Gold-rayed Lily.

Brownii, 4′, sum., whitish br.; a grand Lilium. Vars. Chloraster, viridulum, etc.; 3.

canadense, 1½′ to 4′, sum., yellowish red, spotted red. Vars. flavum, rubrum, etc.; 1.

candidum, 2′ to 4′, Je., wh. Vars. giganteum, peregrinum, spicatum (*syn.* fl. pl.), striatum, and variegatum; 2. Madonna or St. Joseph's Lily.

chalcedonicum, 3′, Jy., sc. Vars. Heldreichii and majus. A bright and favourite plant; 2.

croceum, 3′ to 6′, Jy., or.; 2. The old Orange Lily.

elegans, 6″ to 36″, Jy., sc. (*syns.* thunbergianum and formosum). Many lovely vars.; a good selection—Alice Wilson, yel.; alutaceum grandiflorum, or. red; atrosanguineum, red; aurantiacum, yel.; Batemani, apricot, flore pleno, semi-double; Horsmanni, crim. br.; marmoratum aureum, yel.; Orange Queen, or. red (*see* figure); Prince of Orange, yel.; Van Houttei, red; Wilsoni, apricot, pur. spots; 2.

excelsum (*see* testaceum).

giganteum, 10′ to 14′, Jy., wh.; a noble Lily; 3.

Hansoni, 4′, Je., yel.; very easily grown; 2 (*see p.* 17).

Harrisii (*see* longiflorum var.).

Henryi, 6′ to 15′, Jy., or. yel.; a new species, easily grown; 2.

Humboldtii, 5′, Jy., yel., pur. spots. Vars. bloomerianum, b. magnificum, and ocellatum are fine. Difficult to establish; 3.

lancifolium (*see* speciosum).

longiflorum, 1′ to 5′, Je., wh.; capital for pots, var. Harrisii being a favourite. Others are giganteum, formosanum, præcox, Takesima, Wilsoni (*syn.* eximium), and albo-marginatum with variegated lvs.; 2. The Trumpet Lily.

Martagon, 3′, sum., pur. The best forms are album, wh., and dalmaticum, pur. Others are flore pleno and dalmaticum Cataniæ; 2 for type, 3 for vars. Martagon, or Turk's Cap Lily.

monadelphum, 3′ to 5′, Je., yel. (*syns.* colchicum, szovitzianum, and loddigesianum); 3.

nepalense, 1½′ to 5′, aut., grh., yel., pur outside.

pardalinum, 4′ to 6′, Jy., or. crim. Several vars., Bourgæi very fine, also californicum, Johnsoni, Michauxii, and minor; 1.

rubellum, 9″ to 24″, My., pk. Like Krameri, but easier to grow; 3.

speciosum, 3′, sum., wh. spotted (*syn.* lancifolium); splendid, well known, with many vars., album Krætzeri, a. novum, cruentum, macranthum, Melpomene, roseum superbum, and rubrum being representative; 2.

sulphureum, 4′ to 10′, sum., hlf-hdy., sulphur yel., br. outside (*syn.* wallichianum superbum).

testaceum, 4′ to 6′, Jy., nankeen yel., reliable, probably a hybrid candidum × chalcedonicum (*syns.* excelsum and isabelinum).

thunbergianum (*see* elegans).

tigrinum, 2′ to 7′, Jy., Aug., or. red, blk. spots; the vars. flore pleno, double, Fortunei, and splendens should be grown; 2. Tiger Lily.

umbellatum, 2′ to 3′, Je., red. There are many vars., erectum, aurantiacum, Cloth of Gold, grandiflorum, Incomparable, Sappho, and Sensation are all good and easily grown; 2.

Other Species, Hybrids, and Varieties:—

Alexandræ is a var. of japonicum.

Bolanderi, 1′ to 3′, sum., pur. red; 3.

bulbiferum, 3′, sum., red; 2.

Burbanki, 4′, sum., apricot, variable; hybrid

(pardalinum × washingtonianum) ; 1, 2.
callosum, 2½′, sum., sc., or. red ; 3.
carniolicum, 3′, Je., Jy., red ; var. bosniacum ; 1.
Catesbæi, 1′ to 2′, Jy., sc., spotted pur. ; 1.
columbianum, 3′, sum., red, spotted yel. ; var. lucidum ; 3.
concolor, 9″ to 2′, sum., red ; var. luteum, yel. ; vars. Coridion and pulchellum ; 2.
cordifolium, 4′, Aug., wh. ; 3.
croceo-elegans, hybrid (croceum × elegans).
Dalhansoni, 5′, sum., dark pur. ; hybrid (dalmaticum × Hansoni) ; 2.
dauricum, 2′ to 3′, Je., yellowish red, spotted blk. (*syns.* davuricum, pennsylvanicum, and spectabile) ; 2.
Fortunei, 2′, sum., yel. (not tigrinum Fortunei) ; 2.
Glehni, like cordifolium ; 3.
Grayi, 3′, sum., red, pur. spots ; 1.
Heldreichii, 3′, sum., red ; 2.
Jankæ is near pyrenaicum (*see p.* 20).
japonicum, 2′ to 2½′, sum., ro. (*syn.* Krameri) (not Brownii) ; var. Alexandræ, wh. (*syn.* L. Alexandræ) ; 3.
Kelloggii, 3′ to 5′, sum., pk., pur.
kewense, wh., buff ; hybrid (Henryi × Brownii Chloraster, *see* figure).
Krameri (of Hooker) is japonicum.
Leichtlini, 2′, Jy., yel., pur. spots ; 3.
leucathum, 3′ to 4′, Aug., near Brownii ; 3.
Lowii, 2′ to 3′, wh., spotted vio. (*syn.* bakerianum) ; 3.
Marhan, 7′, sum., or. red, br. spots ; hybrid (Martagon album × Hansoni) ; 2.
maritimum, 3′ to 5′, sum., red, dark pur. spots ; 1.
Masseyi resembles philadelphicum.
Maximowiczii, 3′, Jy., Aug., sc. ; 3.
medeoloides, 1½′, Jy., or. red ; 3.
neilgherrense, 3′, aut., grh., sulphur.
nitidum, 2′, sum., yel. ; 3.
Parkmanni, hybrid (auratum × speciosum), probably lost.
Parryi, 2′ to 5′, sum., yel. ; 1.
parvum, 5′, Jy., Aug., yel. (*syn.* alpinum) ; 1.
philadelphicum, 1′ to 3′, sum., red ; 1.
philippinense, 2′, Aug., grh., wh.
polyphyllum, 3′, sum., wh. ; 3.
pomponium, 2′ to 3′, sum , red ; 2.
puberulum, 3½′, sum., or. red.
pyrenaicum, 2′ to 4′, sum., yel. ; 2.
roseum, 1½′, Ap., My., lil. (*syns.* thomsonianum and Fritillaria macrophylla) ; 3.
rubescens, 5′ to 7′, sum., wh. ; 3.
superbum, 6′, sum., or. crim. ; 1.
sutchuenense, 1′ to 3′, sum., or., red (*syn.* szechnense).
tenuifolium, 1′, sum., sc. ; 2.
wallichianum, 3′ to 4′, sum., grh., wh.
washingtonianum, 3′ to 5′, Jy., wh., var. purpureum ; 3.
yunnanense, red.

LILY.

The name Lily is properly only applicable to the Lilium, but it is popularly used in speaking of other flowers, either alone or in combination with other words. The Narcissi are often called Lilies, and the Lent Lily is N. Pseudo-Narcissus, the wild English Daffodil ; and the Scotch Garland Lily is N. scoticus. Mariposa Lily is the popular name for a section of the Calochorti, the Plantain Lily is the Funkia, the Snake's-head Lily is the Fritillaria, the Lily of the Nile is Richardia africana, the Water Lily is Nymphæa. Herodotus's Water Lily is Nymphæa Lotus, and his Rose Lily of the Nile is the Nelumbo or Sacred Bean, Nelumbium speciosum. The Lily of the Valley, sometimes called the May Lily, is Convallaria majalis. The Peruvian or Herb Lily is the Alströmeria ; the Belladonna Lily, Amaryllis Belladonna ; St. Bruno's Lily, Anthericum Liliastrum ; St. Bernard's Lily, A. Liliago ; the Brisbane Lily, Eurycles Cunninghami ; the Day Lily, Hemerocallis ; the African Corn Lily, the Ixia ; and the Torch Lily, the Kniphofia. The Guernsey Lily is Nerine sarniensis ; the Queen Lily, the Phædranassa ; the Kaffir Lily, the Schizostylis ; the Jacobæan Lily, the Sprekelia ; the Mount Etna Lily, the Sternbergia ; the American Wood Lily, the Trillium ; and the Scarborough Lily, the Vallota. The Madonna or St. Joseph's Lily is Lilium candidum.

LILY BEETLE.

This is a small scarlet beetle (*Crioceris merdigera*), which deposits its eggs on the leaves of the Liliums. From these the larvæ emerge and feed upon the foliage. This beetle is very uncommon

Photo : Cassell & Company, Ltd.

LILIUM KEWENSE.

in gardens, and it can best be coped with by hand-picking or by the use of a decoction of Hellebore, or such an insecticide as Abol.

LILY OF THE VALLEY. (CONVALLARIA MAJALIS.)

Description.—Few flowers are more prized for combined fragrance and beauty, and few are as useful for cut flowers, as the Lily of the Valley (*ord.* Liliaceæ), whose cultivation is constantly extending. Its spikes of drooping white bells are everywhere admired.

Propagation.—By division of the clumps after flowering, or by seeds sown when ripe.

Soil.—It is not particular as to soil, but ought to have one of a rich nature where possible, though any deficiency can be made up by top dressing with decayed manure and by watering with liquid manure.

Culture in the Garden and Grounds.—Lily of the Valley is charming when naturalised in the shadier portions of the grounds. In the garden it is best cultivated in beds, renewed occasionally by sorting out the smaller crowns and replanting the larger, after the bed has been well manured or filled with fresh soil. February and March are good months for this, when the weather is suitable. With proper cultivation good crowns for forcing may be grown at home.

Cultivation in Pots and for Forcing.—For early forcing the Berlin crowns are preferred to the Dutch ones, and ought to be placed in heat as early as the middle of November for Christmas bloom, but retarded Lily of the Valley is often more satisfactory for the earliest work. Place the crowns in pots or boxes about 1″ apart, covering the roots, but not the crowns, with a small quantity of light soil or fibre, and covering the whole with moss. Light should also be excluded until some growth has been made, when it may be gradually admitted. The pots or boxes may either be plunged in a bottom heat of 85° in a house with a moist atmosphere and a temperature of from 65° to 75°, or be put on a shelf in one with a similar heat. Water about the same temperature as that of the structure must be given carefully, as, if the plants become too dry, failure will result. Clumps of Lily of the Valley are also used for later work, the clumps being similarly covered and treated to the crowns. It ought to be mentioned that retarded crowns should not be subjected to much heat at first, but started in a cold frame. For forcing, only large, plump crowns should be used.

Varieties :—

Besides the Berlin and Dutch vars. there are several other forms. Fortin's, or Convallaria majalis grandiflora, is good for any purpose, and has finer spikes than the common one. Prolificans is good for outdoor work. There are also forms of the ordinary C. majalis with double flowers, rose flowers (white under glass), and with gold or silver striped leaves.

LIMATODES *(see* CALANTHE AND PHAIUS).

LIME.

Lime in its natural state is most familiar as limestone and chalk. It is an organic rock formed in the distant past as a sedimentary deposit under the ocean, and is composed of the shelly coverings of tiny marine creatures. Such deposits are still being made, to provide lime for the far distant future. The value of lime in horticultural pursuits can scarcely be over-estimated, but it is well to remember that while it is an excellent servant it is a bad master. In its commonly seen and pure form of quicklime, as used alike by gardener, farmer, and builder, lime is the result of subjecting limestone or chalk to intense heat in a kiln, whereby the large percentage of carbonic acid gas found in the natural or carbonate form, is driven off.

The action of lime upon soils is twofold—chemical and mechanical. Applied as fresh or quicklime to soils containing a large amount of organic matter, such as peaty soils, or land that contains an accumulation of humus, lime combines with the organic matter and rapidly disorganises it, setting free much plant food that previously was not available to the crops. It is this chemical result that renders long-manured gardens so fertile after liming, and it also supplies the reason why new and rank soils are made sweet and fertile when caustic lime is applied. Lime is a soil scavenger, burning up decomposing organisms, and in the process setting free food which the roots of plants are quick to take advantage of.

Photo : Cassell & Company, Ltd.

LILIUM JANKÆ (*see p.* 19) ON ROCKWORK.

When lime is required simply to supply calcareous matter to stone-fruits or other crops, or to improve the soil texture, it is best applied in the mild or slaked form, or as mortar rubbish, old plaster, etc.

Leguminous plants benefit greatly from large dressings of lime to the soil, while Grasses and Potatoes also much appreciate it; but it must never be forgotten that unless organic matter is supplied at intervals, crops will wear out or cease to be productive on much-limed soils. In short, lime is highly beneficial on heavy and freely manured land, and on that containing much vegetable matter, such as peats and newly turned pastures; but it is of little value on poor and light land, indeed, it is in such cases often the worst dressing that could be given.

A few garden plants such as Rhododendrons, those known technically as "Hard-wooded Plants," and some Conifers and Ferns, strongly object to lime either in the soil or in the water artificially supplied.

Lily Thorn (*see Catesbæa*).
Lily, Water (*see Nymphæa and Water Lily*).
Limax (*see Slugs*).

Independently of its action, chemical or mechanical, in soils, lime, when newly slaked, is valuable to the gardener as a slugicide and crop protector. Lime may be added to heaps of fresh, but not decayed, manure. Lime should not be mixed with soot.

LIME, CHLORIDE OF.

The chief value of chloride of lime to horticulturists lies in its capacity for fixing ammoniacal fumes, and as it also is a disinfectant its use on the floors of stables, cow sheds, in urinals, etc., is to be commended, both from a sanitary and a horticultural point of view. Chloride of lime, when exposed to atmospheric influence, soon becomes muriate of lime, owing to its loss of chlorine; but in this condition it absorbs moisture in a wonderful manner, and is a suitable dressing for many light soils, while the chlorine given off is destructive to insect and plant life. Chloride of lime is extensively used for bleaching purposes; skeletonised leaves are made beautifully white if placed in a weak solution for a couple of days.

LIME TREE (*see* TILIA).

LIME WATER.

An effectual method of removing worms from lawns or soil in flower pots is to water the infested areas with lime water. This is made by mixing 10 lb. of newly slaked lime in 30 gallons of water, and then allowing it to stand for a couple of days, when the water should be poured from the sediment, and applied to the soil. The worms will quickly come to the surface, where they can be dealt with.

LIMNANTHEMUM.

Interesting water or marsh plants (*ord.* Gentianeæ), closely allied to Villarsia, and increased by seeds or division. Most species are hardy in the southern counties, but humboldtianum prefers a warm house.

Principal Species :—

humboldtianum, sum., wh., yel.
peltatum, sum., yel. (*syn.* Villarsia nymphæoides).

LIMNANTHES.

Pretty hardy annuals (*ord.* Geraniaceæ), which are of much service for beds, borders, rockwork, or edgings. They are also much frequented by bees. They are of rather prostrate habit, and grow freely in ordinary soil. Propagation is by means of seeds, sown where they are to bloom, in March or April; or early in September for spring bloom. In some soils the Limnanthes sows itself freely.

Only Species :—

alba, 8″, spr. to aut., wh.
Douglasii, 8″, spr. to aut., yel., wh.
rosea, 6″ to 8″, Jy., pk.

LIMNOCHARIS.

Brazilian aquatics (*ord.* Alismaceæ) needing accommodation in a stove, in a tank of warm water. The species are perennial, and can be increased by division, by the runner-like growths, or by seeds. Good loam forms a suitable rooting medium.

Only Species :—

emarginata, 1½′ to 3′, Jy., yel. (*syns.* flava and Plumieri).
Humboldtii, 1½′, yel. (correctly Hydrocleis Commersonii).

Lime, Sweet (*see Citrus medica Limetta*).
Lime, West Indian (*see Citrus medica acida*).
Limodorum tuberosum (*see Calopogon pulchellus*).

LIMONIA.

Evergreen shrubs (*ord.* Rutaceæ) that usually require a greenhouse temperature, but which succeed against a wall in very favoured localities. Propagation is by seeds to secure stocks on which the young plants must be grafted, and by cuttings in very sandy soil beneath a bell-glass, and started over bottom heat. Soil, rich loam and peat, with coarse sand.

Principal Species :—

acidissima, 4′, Jy., wh. (*syn.* crenulata).
Laureola (now Skimmia Laureola).
parviflora, 18′, Je., wh. (now Glycosmis pentaphylla).

LIMONIASTRUM.

Sub-shrubs (*ord.* Plumbagineæ), growing best in the greenhouse. Propagation is by cuttings, or seeds when procurable. Equal parts of fibrous loam and fibrous peat, with coarse sand, suit.

Principal Species :—

articulatum, 3′, Aug., bl. (*syns.* monopetalum, and Statice monopetala). The var. denudata has smaller flowers.

LINARIA. (TOADFLAX.)

Description.—Useful hardy herbaceous, annual, or sub-shrubby plants (*ord.* Scrophularineæ) of considerable diversity of stature, and suited for different purposes in the garden. The taller species are good border flowers, many being also good for cutting, and the smaller make pleasing plants for the rockery. Some of the perennials are troublesome because of their spreading propensities.

Propagation.—The annuals and perennials by seeds sown in spring or when ripe; the perennials also by division in spring or after blooming.

Soil.—Common garden soil.

Principal Species and Varieties :—

alpina, 6″, sum., per., vio., yel. A beautiful plant for rockwork; var. rosea, ro.
Cymbalaria, spr. to win., bl. or lil., trailer. A pretty plant for old walls. White and variegated vars. New maxima vars are good; wh. to ro. Kenilworth Ivy, Mother of Thousands, Pennyleaf and Pennywort.
dalmatica, 3′, Je., per., yel. One of the best for borders.
origanifolia, 6″, Je., wh., vio.; best treated as ann.
purpurea, 3′, Jy., per., pur. Distinct border plant.
reticulata, 2′ to 3′, Je., pur., yel. A charming ann.; the var. aureo-purpurea is beautiful.
triornithophora, 3′, sum., per., but tender and best as a bien., pur., yel.
vulgaris, 2½′, Je., per., yel. A pretty native, the var. peloria being good for cutting and interesting for its regular corolla.

Other Species, Varieties, and Hybrids :—

anticaria, 6″, Je., bien. or per., various colours.
bipartita, 1′, Je., ann., pur.; vars. alba, wh.; splendida, pur.; rosea, ro.
Broussonetii, 3″, Je., ann., yel. (*syn.* multipunctata).
Cavanillesii, 6″, Je., ann., pur. (*syns.* antirrhinoides and antirrhinifolia of gardens).
chalepensis, 9″, Je., ann., wh.
genistifolia, 3′, Je., per., yel. (Not Bentham or De Candolle.)
hepaticæfolia, 2″, Je., per., pur.
heterophylla, 1½′, Je., per., yel., br. (*syn.* aparinoides).
—splendens, crim. (*syn.* L. splendens).
macedonica, 3′, Je., yel.
maroccana, 9″, Je., ann., pur.; hybrida, various colours. A hybrid.
pallida, 6″, Je., per., vio.

pilosa, 4″, Je. to Sep., per., pur.; var. longicalcarata, long spurs.
saxatilis, Aug., per., yel., trailer.
spartea, 1′, Jy., ann., yel.
triphylla, 1′, Jy., ann., yel.
tristis, 6″, Jy., ann., yel., pur.
villosa, 1′, Jy., per., bl.

LINCONIA.

Evergreen shrubs (*ord.* Bruniaceæ) requiring greenhouse treatment. Propagation is by spring cuttings in very sandy peat beneath a bell-glass. Soil, fibrous loam and fibrous peat in equal parts, with sand and charcoal.

Principal Species :—

alopecurioides, 2′, My., wh. or flesh pk.
cuspidata, 2′, My., Je., wh.
thymifolia, 2′, My., wh.

LINDELOFIA.

Hardy perennials (*ord.* Boragineæ) that are propagated by division or by seeds, and will flourish in any fairly fertile garden soil.

Principal Species :—

longifolia, 2′ to 2½′, My., bl., probably a var.
spectabilis, 1½′, Jy., pur. (*syn.* Cynoglossum longiflorum).

LINDENIA.

Evergreen shrubs (*ord.* Rubiaceæ) flourishing in the stove. Propagation is by cuttings in sandy soil beneath a bell-glass over bottom heat. A mixture of fibrous loam, peat, and sand suits.

Principal Species :—

rivalis, 3′, Aug., wh., red.
vitiensis, 3′ to 4′, cream.

LINDERA.

A group of shrubs (*ord.* Laurineæ), closely allied to Laurus. Most of the species are hardy, except in very exposed situations, but pulcherrima must certainly receive greenhouse protection. Propagation is by layering, by cuttings inserted in sandy soil under a hand-light at the end of summer, or by seeds when obtainable Fertile garden soil suits, but the position must not be a wet one; for pot plants, use loam, peat, and sand.

Principal Species :—

Benzoin, 15′, spr., yel. (*syn.* Laurus Benzoin).
pulcherrima, 4′, sum., grh., yel. (*syn.* aggregata).

LINDHEIMERA.

A little grown genus (*ord.* Compositæ) of half-hardy annuals, which have their flowers in flat-topped heads. The blooms are yellow, and the plants may be raised from seeds sown as directed for half-hardy annuals. Rich, but not too heavy, soil.

Principal Species :—

mexicana, 1½′, Aug., yel.
texana, 1½′, Aug., yel.

LINDLEYA.

The only member of note in this genus (*ord.* Rosaceæ) is mespiloides, 20′, July, white, very fragrant. It is a stove evergreen shrub, best propagated from cuttings of ripe wood in very sandy soil beneath a bell-glass over bottom heat. Soil, mellow loam and coarse sand.

LINDSAYA. (Lindsæa.)

Description.—A genus of handsome dwarf Ferns (*ord.* Filices) that are, unfortunately, by no means easy to keep in good condition for any length of time. There are about fifty species, but few are in cultivation, notwithstanding their beauty.

Propagation.—By spores sown as soon as ripe, or by division in spring in the case of species with creeping rhizomes.

Soil.—Fibrous loam and peat, with sand, and small pieces of sandstone.

Other Cultural Points.—Good drainage is essential, but at the same time an abundance of moisture at the roots and in the atmosphere is equally necessary. An intermediate or stove temperature suits the majority, but some of the Australian species do best in a greenhouse. Use every means to keep the fronds free from disfigurement by thrips.

Principal Species :—

adiantoides, 6″.
ensifolia, 1′ (*syns.* Schizoloma ensifolium and griffithiana).
flabellulata, 1′.
heterophylla, 1¼′ (*syn.* Schizoloma heterophyllum).
Kirkii, fronds 2′ to 4′, st., handsome.
reniformis, 6″, kidney-shaped fronds (*syn.* Isoloma reniforme).
retusa, 1½′, very handsome for baskets (*syn.* Davallia retusa).
trichomanoides, 9″, grh.

LININGS.

When Cucumbers, Melons, etc. are grown in frames placed upon a hotbed, there is a danger that the crops may suffer when the heat of the fermenting material used commences to decline. To guard against this danger, a new source of heat is supplied in the form of a thick wall of nearly fresh stable litter, packed closely round the old hotbed, and made somewhat higher than it. Such additions are technically known as "linings." To obtain the fullest value from these "linings" it is necessary, before adding them, to remove a large portion of the spent or cool litter from the sides of the old bed. Thatched hurdles placed against the exposed sides will prevent the rapid escape of heat.

LINNÆA.

A trailing evergreen sub-shrub (*ord.* Caprifoliaceæ) that is hardy and easily propagated by division. It must be grown in peat, and in a shady position.

Only Species :—

borealis, 4″, Je., pale pk., fragrant.

LINUM. (Flax.)

Description.—Desirable, ornamental, and free-flowering annual or perennial plants (*ord.* Lineæ) of great beauty in borders or rock gardens, the best known, perhaps, being the popular annual grandiflorum coccineum or rubrum. The perennial species are well deserving of more attention.

Propagation.—The greater number are propagated by seeds, the perennials being sown in pots under glass in spring, but the annuals in spring where they are to bloom. The herbaceous species may be divided when large enough, and the shrubby species are increased by cuttings under glass in spring or summer.

Soil.—Light, rich soil.

Principal Species and Varieties :—

alpinum, 4″, Jy., bl. A charming Alpine.
arboreum, 1′, My., yel. A pretty shrub, but a little tender.
flavum, 1¼′, Je., hdy.

Linden Tree (*see Tilia*).
Lindsæa (*see Lindsaya*).
Ling (*see Calluna*).

per., yel. A pretty yel. Flax.
grandiflorum, 6″ to 12″, sum., ro., a fine ann. Vars. coccineum and kermesinum are preferable.
monogynum, 1′, Jy., per., wh. A fine, but rather tender, species.
narbonense, 2′, May, hdy. per., bl. or wh.
perenne, 1′, Je., bl., useful and hdy. Vars. album, wh. (*see* figure) and sibiricum.
usitatissimum, 1½′, Je., ann., bl. Produces the flax and linseed oil of commerce. The Common Flax.

LIPARIS.

Description.—A large genus of Orchids (*ord.* Orchidaceæ), possessing few species sufficiently attractive to commend them to horticulturists. The hardy species are terrestrial, while those needing stove or warm greenhouse treatment are epiphytic. Nearly all are low-growing, and produce their small flowers in racemes. Loeselii is a British plant, but now rarely found outside the fen districts.

LINUM PERENNE ALBUM.

Other Species :—

angustifolium, 1′, Jy., pur.
austriacum, 1½′, Je., pur.
— album, wh.
campanulatum, 1′, Je., yel.
capitatum, 9″, Jy., yel.
Chamissonis, 1′, sum., yel. (*syn.* Macræi of *Botanical Magazine*).
pubescens, 12″ to 15″, grh., pk.
salsoloides, 1′, Je., hdy. ev., wh., pur. eye (*syn.* suffrutescens).
tenuifolium, 1½′, Je., per., pk.
viscosum, 6″, Je., pur., bl.

LIPARIA.

Greenhouse evergreen shrubs (*ord.* Leguminosæ). Propagation is by cuttings of the young growths in sand under a bell-glass. Soil, fibrous loam and peat, with coarse sand; perfect drainage is essential.

Principal Species :—

parva, 2′, Mch., or.
sphærica, 3½′, Jy., or.
villosa (now Priestleya vestita).

Lion's Ear (*see Leonotis*).
Lion's Foot (*see Leontopodium*).
Lion's Tail (*see Leonotis Leonurus*).

Propagation.—By division just before new growth commences.

Soil.—The hardy species need boggy peat, shallow planting, and a surfacing of sphagnum; stove species do best in well-drained pots, pans, or baskets, in a mixture of fibrous peat, sphagnum, and finely broken crocks.

Principal Species :—

atropurpurea, 6″, Je., dark pur.
elata, 10″, sum., pur.
fulgens, 9″, deep red.
liliifolia, 8″, Jy., hdy., pur. (*syn.* Malaxis liliifolia).
Loeselii, 6″, Jy., hdy., yel.
longipes, 6″ to 15″, sum., grh. This and its vars. pendula and spathulata are most floriferous, and make elegant specimens.
saundersiana, 6″, Jy., grh., vio.

Other Species :—

reflexa, 6″, Sep., grh.
— decursiva, 6″, sum., grh.
tricallosa, 10″, sum., yel., pur.

LIPARIS.

Several members of this fairly large family of moths are garden pests, the chief offenders being

the "Gipsy Moth" (dispar), the "Gold Tail Moth" (auriflua), the "Satin Moth" (Salicis), the "Brown-tail Moth" (chrysorrhœa), and the "Black Arches" (monacha). In all cases the larvæ are showy, the bodies being studded with tufts of brightly hued hairs. Whitethorn, Apples, Plums, and other Rosaceous trees suffer most from their ravages (*see* GIPSY MOTH). The Black Arches is not often troublesome in this country; it generally confines its attention to Coniferous, Oak and Birch trees. The Satin Moth generally feeds on Poplar and Willow.

LIPPIA.

An extensive genus of stove, greenhouse, rarely hardy shrubs, sub-shrubs, or herbaceous plants (*ord.* Verbenaceæ). They are distinguished by small, opposite or whorled, sometimes fragrant, leaves, and racemes of small, white or pinkish flowers from the leaf axils. Citriodora is the most popular species; it is usually grown under the name of the Lemon-scented Verbena, so called from the pleasing odour given off by the leaves when rubbed. It makes a large bush with long, narrow, rough leaves. In favoured localities it grows well in the open, bushes 6′ or more in height being recorded that have passed unharmed through several winters. About London it succeeds well against a wall, but does not thrive in the open ground. Cuttings of young shoots root readily in sandy soil in heat in spring. A rich, light soil is suitable for all the species. An annual pruning is necessary before growth begins in spring.

Principal Species:—

bracteata, grh. shr., red.
canescens, 3″ to 4′, sum., hdy., lil. (*syns.* repens of gardens and filiformis).
citriodora, 3′ to 12′, Jy., wh. (*syn.* Aloysia citriodora). Lemon-scented Verbena.
nodiflora, 3″ to 6″, sum., hdy., herbaceous, wh. or pur.

LIQUIDAMBAR.

Deciduous trees (*ord.* Hamamelideæ) found in the temperate parts of Asia and North America. A few species only are in cultivation, but they are very desirable trees for the garden on account of the brilliant red and orange red tints assumed by the leaves previous to their falling in autumn. In general appearance they most closely resemble some of the smaller leaved Acers. The flowers are small, and borne in catkins, male and female being in separate catkins. The foliage and wood of styraciflua are very fragrant, and from the plant a sweet-smelling gum is obtained. Propagation, by seeds or layers. Good, loamy soil, with a little shelter from cold winds, is an important factor to success.

Principal Species:—

formosana, 20′ to 30′ (*syns.* acerifolia and Maximowiczii).
orientalis, 20′ (*syn.* imberbis).
styraciflua, 30′ to 50′.

LIQUID MANURE.

As the roots of plants can only absorb food in liquid form, it follows that crops will more readily respond to applications of liquid manure than to dry manure, which must combine with rain or soil moisture before it is available as plant food. The chief advantages of liquid manure are quick and effectual action, economy, and that it may be applied at the time when crops will most benefit by it. There is also less danger in feeding crops with liquid than with dry manures, especially when highly concentrated and patent manures are used, but while it is safe to follow the maker's directions, in the latter case it is always better to give several weak doses than one very strong one. This applies more to plants in pots and confined borders than to those planted in the open, and to crops of annual or less duration than to those of perennial and arboreal character. Liquid manure should vary in character according to the effect the grower desires to produce. If rapid growth is deemed necessary, a nitrogenous fertiliser, such as nitrate of soda or sulphate of ammonia, dissolved at the rate of 1 oz. in 3 or 4 gallons of water, will be suitable, but guano employed in similar proportion has a more sustained effect, and is of great value for pot plants of many kinds. Soot is doubly useful, as it is in some respects an insecticide as well as a fertiliser; it is prepared by placing 1 peck of soot (enclosed in a canvas bag) in a hogshead of water, giving it a stir round occasionally during the first two days. The soot water may be used at full strength for most crops. Superphosphate is not often applied in liquid form, but if dissolved at the rate of ½ oz. per gallon of water, and given to Vines and fruit trees in pots and borders, wherever there is some accumulation of humus, it produces good effects.

All things considered, one of the most generally useful and suitable liquid fertilisers is made from fresh cow manure. Put ½ bushel in a sack and place it in a tub, then pour in 20 gallons of water, and allow the whole to remain twenty-four hours before use; dilute with clear water to the colour of pale ale. A second 20 gallons of liquid can be made from the same manure provided the latter is well stirred. Formerly there was a great waste of liquid manure in large gardens and farmsteads, the drainings from stables, cowsheds, pigsties, and the manure yard being allowed to waste; but now every well appointed establishment has a large, covered tank, into which all such drainings are conducted, and from which the liquid fertiliser may be pumped. Such a tank should prove of far greater value than many tons of artificial manure, for if diluted to pale ale colour the liquid is suitable alike for pot plants, fruits under glass, the herbaceous border, the Rose garden, and the kitchen and fruit gardens, while its value when applied fairly strong to fruit trees of all kinds during winter, can scarcely be over-estimated. In smaller gardens, where this kind of liquid manure is not obtainable, crops might receive considerable assistance if the house slops were collected and applied, well diluted, to growing crops, or poured in a stronger state round the roots of fruit trees in winter or spring.

LIRIODENDRON. (TULIP TREE.)

One species only of this North American genus (*ord.* Magnoliaceæ) is known. It forms a very handsome and striking specimen, being in fact one of the most ornamental of hardy trees. The foliage and also the habit are somewhat suggestive of the Plane. The species tulipifera takes its name from the flowers at first sight being somewhat like a Tulip. On closer examination they will be found to resemble those of the Magnolia, but are pendulous instead of upright. Flowers are not borne until the trees have attained a considerable age,

Liquorice (see Glycyrrhiza).

but the plant is worth growing for foliage alone. It is usually increased by means of seeds sown in spring. The varieties, of which there are several, are grafted on stocks of the type. Loam, or a mixture of peat and loam, forms a suitable soil, and when planting it is important that the roots should be disturbed as little as possible.

Only Species and Varieties :—

tulipifera, 70′ to 100′, sum., grn. and yel.
— aureo-maculata, golden variegated lvs.
— integrifolia, entire lvs.
— fastigiata, upright habit.
— obtusiloba, lvs. blunter.
— pyramidalis, pyramidal.
— variegata, variegated lvs.

tings of the tips of the growths in late spring in sandy peat beneath a bell-glass. Soil, fibrous peat, with sand.

Principal Species :—

sapida, 4′, Je., wh., grn., red berries.
strigosa, 3′, Je., wh.

LISSOCHILUS.

Terrestrial Orchids (*ord.* Orchidaceæ) chiefly from South Africa. They have long leaves, and tall flower spikes that in many cases bear showy flowers. Increase is by division in spring when new growth starts. Fibrous peat, loam, leaf soil, and sand suit. A high temperature with plenty of light and sunshine is needed during summer, but an intermediate

LIVISTONA CHINENSIS, EXTENSIVELY GROWN UNDER THE NAME OF LATANIA BORBONICA (*see p.* 26).

LIRIOPE.

Hardy ornamental foliage plants (*ord.* Hæmodoraceæ) that are propagated by division and will flourish in any fertile soil.

Principal Species :—

spicata, 1′, Oct., vio. (*syns.* graminifolia and Ophiopogon spicatus); var. densiflora.

LISIANTHUS.

Stove annuals or evergreen shrubs (*ord.* Gentianeæ) not often met with in cultivation, but including several attractive and deserving species. Annuals are raised in spring or autumn, in heat; shrubby species are increased by cuttings of short, firm growths. Loam, peat, and sand form a suitable compost. Guard against mildew.

Principal Species :—

acutangulus, 4′, spr., ann., yel.
princeps, 4′, sum., crim.
sc. (*syn.* Wallisia princeps.)
pulcher, 5′, Aug., sc.
russellianus (*see* Eustoma russellianum).

LISSANTHE.

Evergreen shrubs (*ord.* Epacrideæ) requiring a greenhouse temperature. Propagation is by cut-

temperature suffices at other times. All the species need a long and decided rest, when water must be withheld.

Principal Species :—

giganteus, 10′, aut., pur., lil., yel.
Horsfallii, 3½′, sum., pur., bracts wh.
Krebsii, 3′, sum., grn., pur., yel.
parviflorus, 1½′, aut., red (*syn.* Eulophia parviflora).
roseus, 3½′, sum., ro., br., yel.
Sandersoni, 6′, Je., wh., bracts vio.
speciosus, 2½′, Je., yel.
streptopetalus, 2′, Dec., yel.

LITANTHUS.

A genus (*ord.* Liliaceæ) containing only one species, pusillus, a South African bulbous plant, growing 2″ high and bearing small white flowers in August. It may be grown in pots of loamy soil in a sunny greenhouse or frame, and increased by division.

LITHOSPERMUM. (GROMWELL.)

Description.—A large genus of hardy biennial or perennial plants (*ord.* Borragineæ), of which many

Listrostachys (*see Angræcum*).
Lisyanthus (*see Lisianthus*).

are useless for garden decoration, while others are of great beauty.

Propagation.—By seeds; also by cuttings under glass and division of the perennials.

Soil.—Common soil will answer for the greater number, but some of the Alpine species, such as graminifolium, do best in light soil in a sheltered rock garden.

Principal Species:—

canescens, 1′, Jy., per., yel., a pretty plant (*syn.* Batschia canescens).
Gastoni, 9″, Je., bl., wh. eye, a charming, scarce Alpine.
graminifolium, 9″, Je., bl., a fine Alpine (*syn.* Moltkia graminifolia).
prostratum, Je., hdy. per., bl., trailer, perhaps the most prized on rockwork or over an edging.

Other Species:—

angustifolium, 1′, Je., yel.
hirtum, 6″, Je., yel. (*syn.* Batschia Gmelini).
latifolium, 2′, My., yel. or wh.
officinale, 1½′, Je., grn., yel., Common Gromwell.
purpureo-cæruleum, My., Je., per., pur., trailer.
rosmarinifolium, 1½′, Je., ev. per., bl., lined wh. (*syn.* graminifolium of Roem. and Schult.).

LITSEA.

A large genus of evergreen or deciduous shrubs (*ord.* Laurineæ) of little horticultural value. The majority of the species are tender, but a few will thrive out of doors if given a sheltered position. Cuttings of half-ripened wood root readily in a close case. Any good soil suits.

Principal Species:—

ferruginea, 6′, hlf-hdy.
geniculata, 6′, My., hdy., yel. (*syns.* Laurus geniculata and Tetranthera geniculata).
japonica, 3′, My., wh.
tomentosa, 4′, My., wh.

LITTONIA.

A small South African genus (*ord.* Liliaceæ) of herbaceous perennials requiring warm greenhouse culture. The only species cultivated is modesta. It makes succulent branches 3′ to 4′ long, climbing by means of tendrils from the ends of the leaves, and bears nodding, bell-shaped, orange blossoms from the leaf axils in early summer. A mixture of two parts loam to one each of leaf mould, peat, and sand forms a suitable compost.

LIVISTONA.

Fan-leaved Palms (*ord.* Palmæ) of considerable value for decorative work. Upwards of a dozen species are known. They usually make lofty trees, crowned with an immense head of leaves. The two species australis and chinensis are largely grown for house decoration, being most useful Palms for that work. Flowers are not borne until the plants have attained a large size; they are usually small and yellow, and borne in large quantities on immense branched racemes. The flowers are followed by hard, black, Nut-like fruits. Propagation is by imported seeds sown in heat as soon as received. Good fibrous loam, with sufficient sand to ensure porosity, forms the best compost. To this well-rotted manure and ½″ bones should be added for old plants. When young it is advisable to plunge the pots in a bed of tan over hot water pipes, keeping the house close, warm, and moist. By this means growth is more rapid, and fine plants are sooner obtained. Care must be taken to gradually harden them off before they are used for decorative work in cold rooms. The leaves should always be kept clean and free from insects. Liquid manure will be found advantageous when the pots are well filled with roots.

Principal Species:—

All enumerated below grow to large dimensions, but under cultivation they are rarely seen exceeding 10′ or 15′ in height, as after they have attained that height they become too unwieldy for ordinary uses. As the species differ greatly at various stages of growth, it is not of much practical use to describe them individually.

australis.
chinensis (*syns.* mauritiana and Latania borbonica, *see p.* 25).
humilis (*syns.* inermis and Leichardtii).
jenkinsiana.
Leichardtii (*see* humilis).
mauritiana (*see* chinensis).
Woodfordii.

Other Species:—

altissima.
Drudei.
olivæformis.
Ramsayi (*see* Licuala Muelleri).
rotundifolia.
subglobosa.
Woganii.

LLAVEA.

Llavea cordifolia, the only species (*ord.* Filices), is an evergreen intermediate or greenhouse Fern, somewhat difficult to grow. Propagation, by division in spring. Soil, loam and peat, with plenty of finely broken bricks. No syringing may be done, but an abundance of ventilation must be afforded.

LLOYDIA.

Small-growing, hardy, bulbous plants (*ord.* Liliaceæ), a few species only being known. These are found in Europe, Asia, and North America, one species being found in the British Isles. The bulbs are small, and bear a few narrow radical leaves. The flower stem arises from the centre of the bulb to a height of 6″, bearing a few small leaves and a solitary white or yellow flower. They are increased by seeds or division, and like a well-drained sunny border of sandy soil.

Principal Species:—

alpina, 6″, Je., wh. (*syns.* serotina and striata).
græca, 6″, Je., yel.
rubroviridis, 6″ to 9″, My., Je., grn., red.
triflora, 8″, Je., yel., three flowers on a spike.

LOAM.

This term is applied by gardeners to almost any kind of soil other than that of a peaty nature. It is usual, when speaking of loam, to use a descriptive term with the word, as, for instance, maiden, turfy, fibrous, clayey, light, heavy, black, or brown. For many indoor plants loam forms the principal part of the compost in which they are grown, and the sort preferred is maiden, or the top 4″ from old pasture land. As a rule the best is nut brown in colour, a perfect mat of fibres, and neither very sandy nor very clayey. For the majority of indoor plants loam that contains a large quantity of chalk is not to be commended, that with a less proportion being much better. For outdoor work light sandy loam is best for early crops, and that of a heavier nature for late.

LOASA.

A genus (*ord.* Loasaceæ) including annuals, biennials, and evergreen perennials among its species. All are characterised by the poisonous stinging properties possessed by the leaves and

Lithræa (*see Rhus*).
Litobrochia (*see Pteris*).
Littæa (*see Agave*).

stems. The species vary greatly in habit. Some form short, bushy plants, others assume a climbing habit, whilst another set are prostrate growers. The flowers are usually showy, and borne from the axils of the leaves either solitary or in racemes or panicles. In colour they are white, yellow, or red. Few species are cultivated, on account of their dangerous properties. They may be propagated from seeds sown under glass in March, and transferred to the open border in May; or they may be raised by sowing the seeds in a sunny border of light soil in May, and treated like other annuals. The biennials should be sown in July out of doors, and treated as other biennials. The few perennial species require greenhouse treatment. In all cases a light fibrous loam forms the most suitable soil, and throughout the growing season plenty of water is required.

Principal Species :—

hispida, 1½′, Jy., ann., yel. (*syn.* ambrosiæfolia).
lateritia (*see* Blumenbachia laterita).
prostrata, 6′, sum., ann., yel.
vulcanica, 2′, sum., ann., red, yel., wh. stripes.

Other Species :—

acanthifolia, 4′, sum., ann., yel.
alba, 2′, sum., ann., wh.
bicolor, 1′, Jy., ann., bl.

LOBELIA.

Description.—A large genus of hardy or tender annual or perennial plants (*ord.* Campanulaceæ), of which comparatively few are in cultivation. These are adapted for the open garden or for growing under glass. The dwarf varieties derived from Erinus are very useful, but the species of the type of fulgens and cardinalis are suitable for places where taller plants are needed, and where their fine colours will be acceptable. The curious tender Tree Lobelias are cultivated at Kew. Some useful hardy hybrids from syphilitica have been raised within recent years.

Propagation.—By seeds, cuttings, or divisions. There is a steady improvement in the constancy of the bedding Lobelias from seeds, and seedlings are most vigorous in their growth. They should be sown in pans of light, sandy soil, about March, in a warm house, covering the seeds slightly. As soon as they can be handled the seedlings must be pricked off into boxes, and kept under glass until bedding-out time. To propagate varieties of approved worth a few plants may either be kept in pots or lifted from the open ground and potted in autumn, and kept during winter in a frame or greenhouse, giving plenty of light and air when the weather is favourable. They should be kept dry to prevent damping-off. Remove to a warm house early in the year, and insert the young growths in light, sandy soil as soon as they are fit to take off. When rooted, harden off gradually. The taller Lobelias are also raised from seeds, sown when ripe or in spring in a frame, and by cuttings of the young shoots under glass, as well as by division.

Soil.—Light soil, with a proportion of leaf mould and sand, is the best for the dwarf, bedding Lobelias, but the taller species can hardly have one too rich. They must also have plenty of water, and early staking. Plants in pots like a free but rich soil.

Other Cultural Points.—The taller half-hardy Lobelias ought either to be well protected with Cocoanut fibre refuse or ashes in winter, or, preferably in most districts, lifted and kept in a frame or house where they can be watered carefully. Unless given a little heat in spring these sometimes fail to start.

Photo: E. J. Wallis, Putney, S.W.

LOBELIA TENUIOR.

Principal Species and Varieties :—

cardinalis, 3′, Jy., almost hdy., sc.; likes moisture at roots in sum. Vars. Crimson Beauty and atrosanguinea. Cardinal Flower.
Erinus, 6″, sum., hlf-hdy. per., bl.; many vars., single and double, of various shades of bl., wh., maroon crim. Good blues are—Barnard's Perpetual, Brighton Blue, Cobalt Blue, Crystal Palace, Emperor William, Oxonian, Royal Blue. Whites—compacta alba, White Gem, White Lady. Others — Carmine Gem, car.; Colibri, pk.; Prima Donna, maroon crim.; tricolor, wh. eye and car. spot on bl. or pk. ground. Ramosa vars. are taller, and with larger flowers.
fulgens, 1′ to 3′, My., sc.; a splendid plant, with a number of vars.; alba, wh.; Firefly, crim.; Heavenly Blue, bl.; Lord Ardilaun, crim.; Queen Victoria, vermilion; rosea, ro.; Snowflake, wh.; and violacea, red vio.
syphilitica, 2′ to 4′, Jy., bl. The hardiest, and the parent of several pretty hybrids. There is also a wh. var.
tenuior, 1½′, Jy., Aug., grh., bl. (*see* figure). — grandifebra, larger.

Other Species and Hybrids :—

amœna, 2′ to 4′, Jy., hdy. per., bl.
anceps, Je., grh. per., bl., trailer.
Cavanillesii, 3′, Jy., hlf-hdy., red.
coronopifolia, Jy., bl., trailer.

debilis, Jy., grh. ann., bl., trailer (*syn.* Speculum).
Gerardi, 4′, Jy., hdy. per., vio., hybrid (cardinalis × syphilitica), vars. pk. to pur.
glandulosa, 3′, Sep., hdy. per., bl.
Kalmii, 1½′, Jy., hdy., bl.
laxiflora, 3′, Jy., hlf-hdy. per., red.
Milleri, 3′, Jy., hdy. per., pur., hybrid (fulgens × syphilitica).
polyphylla, 4′, Sep., hlf-hdy. per., pur.
Rivoirei, 4′, ro.; hybrid.
sessilifolia, 1′ to 4′, Jy. to Aug., vio.
splendens, 2′ to 3′, sc.; said to be a var. of fulgens.
— Kernerí, a fine form.
triquetra, 1′, Jy., hlf-hdy., bl.
Tupa, 4′ to 6′, Aug., hlf-hdy., sc. (*syn.* Feuillei and Tupa Feuillei).
umbellata, 1′, Je., grh. per., bl.

LOBOSTEMON.

Shrubby or sub-shrubby greenhouse plants from South Africa (*ord.* Boragineæ). In general appearance they closely resemble Echium. The flowers are arranged in large terminal inflorescences. A great many species have been described, but very few are cultivated. Plants are soon obtained from seeds sown in sandy soil in heat in spring. Repotting should be performed at frequent intervals, as they are fast growers. A good soil is composed of two parts fibrous loam to one part of leaf mould and well-rotted manure, with an addition of sharp sand. Fumigation should be avoided, for, like Echiums, they are easily injured by tobacco smoke.

Principal Species :—

argenteus, 3′, Je., bl.
ferocissimus, 5′, Je., bl.
formosus, 3′, Je., pk.
fruticosus, 3′, Je., red, bl.
glaucophyllus, 2′, My., bl.
Swartzii, 2′, Je., bl.

LOCKHARTIA.

A genus of stove Orchids (*ord.* Orchidaceæ), with erect, branching, leafy stems, and small or medium-sized flowers, borne one or two together in the axils of the leaves, or in some species slightly panicled. Propagation is easily effected by side shoots, using them as cuttings. Being epiphytic in moist, warm countries, the species require to be wired on blocks or rafts of wood with a small quantity of sphagnum, and placed in the moist atmosphere of the East Indian house.

Principal Species :—

acuta, 6″, Je., yel., pur., br. (*syn.* Fernandezia acuta).
amœna, 6″, yel., pur.
elegans, 6″, yel., pur. (*syn.* Fernandezia elegans).
lunifera, Jy., yel. (*syn.* Fernandezia lunifera).
pallida, 6″, yel., or.
verrucosa, 1′, yel., red (*syn.* Fernandezia robusta of Bateman).

LODDIGESIA.

A small greenhouse evergreen shrub (*ord.* Leguminosæ), with leaves similar to those of a Cytisus. Oxalidifolia, the only species, is 18″ high, with terminal racemes of pale purple flowers in June. Propagation, by tips of the shoots in spring, in sandy peat and loam, under a bell-glass. Give rooted plants a mixture of peat and loam in equal parts, with a liberal quantity of sand. Keep the plants cool in summer.

LODOICEA.

Description.—A monotypic genus of Palms (*ord.* Palmæ), producing immense, fan-shaped leaves about 20′ long and 12′ wide on vigorous trees twelve to thirty years old. The texture of the leaves is very thick and hard, with a metallic ring when struck. The tree is known as the "Coco de Mer," from the fact that the huge nuts were first picked up at sea before its native home in the Seychelle Islands was discovered in 1743. Another popular name, "Double Cocoanut," takes its rise from the deeply two-lobed character of the nut.

Propagation.—Imported nuts are placed on the Cocoanut fibre refuse of a propagating pit and kept at a temperature of 80° to 90° till the radicle begins to push out, after a lapse, it may be, of several months.

Soil.—When the radicle has attained a length of some inches the nut should be placed on the surface of a large pot filled with good fibrous loam, a little peat, and plenty of sand. Drain the pot well.

Other Cultural Points.—When two or three leaves have been made, the seedling may be treated as an adult, by placing the pot containing it on the bottom of another, inverted in a tank so that the base of that containing the plant will just dip into the water. The tank should be kept at a temperature of 80° in summer. The tank may be dried in winter, and the night temperature of the house kept as near 60° as possible. This Palm may also be grown in an ordinary stove with a moist atmosphere and a temperature of 65° to 90° in summer.

Only Species :—

sechellarum, 60′ to 100′ (*syns.* callipyge, maldavica, and seychellarum).

LŒSELIA.

Small greenhouse shrubs or herbs (*ord.* Polemoniaceæ), with violet, red, or scarlet flowers in the axils of the upper leaves, or crowded at the apex of the shoots. Propagation, by cuttings in sand under a bell-glass. For soil, use fibrous loam and peat in equal parts, with a good dash of sand.

Principal Species :—

cœrulea, 1′, Je., bl. (*syn.* Hoitzia cœrulea).
coccinea, 3′ to 4′, Je., sc. (*syns.* Hoitzia coccinea and H. mexicana).
glandulosa, 2′, Je., red (*syn.* Hoitzia glandulosa).

LOGANBERRY.

The result of a cross between the Raspberry and the Blackberry. The hybrid is to some extent intermediate between these two parents, and is a heavy cropper. The fruit is large, and like that of the Raspberry in shape, but with larger pips, of darker colour, juicy, and acid. Propagation, by division in autumn, these divisions being wintered in frames and planted in March; or by cuttings of short side shoots in summer. Soil, moist loam.

LOGANIA.

Greenhouse herbs or sub-shrubs (*ord.* Loganiaceæ), with small white or flesh-coloured flowers in terminal or axillary heads. Propagation, by side shoots getting firm at the base, in sand, under a bell glass. Soil, fibrous loam and peat, kept well open by sand and small nodules of charcoal.

Principal Species :—

floribunda, 2′, Ap., wh. (*syns.* revoluta and Euosma albiflora).

Locheria (*see Achimenes*).
Locust Tree (*see Robinia, Ceratonia, and Hymenæa*).
Logwood (*see Hæmatoxylon*).

LOISELEURIA.

A miniature hardy procumbent shrub (*ord.* Ericaceæ), with small, dark green, leathery leaves, and small pink or rose flowers. Propagation, by division of the pieces, or by taking off rooted shoots. Soil, moist sandy peat. As it grows on the exposed

LOMARIA DISCOLOR FALCATA (*see p.* 30).

tops of mountains, the plant should be planted in a peat bed on the rockery, fully exposed to light and air, and plentifully supplied with moisture.

Only Species:—

procumbens, 2″ to 3″, My., Je., hdy., pk. or ro. (*syn.* Azalea procumbens).

LOLIUM.

A genus of annual, biennial, and perennial Grasses (*ord.* Gramineæ), a few of which are extensively used for temporary and permanent pastures as well as for hay making. In the garden, pleasure ground, or park, the common or perennial Ryegrass (perenne) always forms a component part of the turf; and the more nearly the soil approaches the nature of rich, moist, meadow land, so will the Ryegrass predominate. Being perennial, and of a rich green, it is well adapted for the purpose. It has about twenty-nine synonyms and several varieties, all indicating its wide utility. It is always propagated by seeds. Where the soil is dry and poor, its place in the turf is taken by Fescue, Dog's-tail, Agrostis, etc. Ryegrass can be encouraged to grow by the use of nitrates, and by heavy top dressings of good soil, or farmyard manure, in winter.

Lomagramme pteroides (*see Acrostichum blumeanum var.*).

LOMARIA.

Description.—A large genus of handsome stove greenhouse and hardy Ferns (*ord.* Filices), easy to grow, and favourites in almost all gardens. Botanically the genus is closely allied to Blechnum, and a number of plants have figured in both genera. The plants bear barren and fertile fronds, which may be either simple or pinnate, according to the species. Gibba is perhaps the most popular, but Spicant, the British Hard Fern, and its many varieties, do well in a cool house as well as out of doors. Ciliata may with advantage be employed for house decoration. Alpina, Germainii, and lanceolata, being of small stature and slow-growing, are very suitable for culture in window cases, and although alpina is nominally hardy it does better with shelter. Fluviatilis makes an elegant basket subject, and L'Herminieri does best when planted in pockets in dead Tree Fern stems.

Many of the Lomarias, particularly L'Herminieri and attenuata, are noteworthy for the pretty rose pink tints of the young fronds. The fronds of Spicant and its varieties last well when cut.

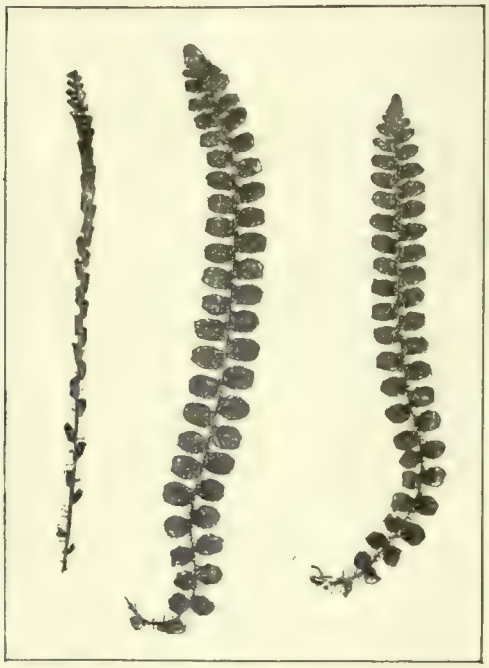
Propagation.—By spores. Except in a few instances, these are freely produced and germinate quickly. Special varieties may be divided, and this is the best method of increasing the lovely varieties of Spicant. Suckers, or offsets, may be utilised in the case of ciliata, gibba, and a few others.

Soil.—Equal parts loam, leaf mould, and sand. If leaf mould is not available peat may be employed, although it is not so good.

LOMARIA GIBBA (*see p.* 30).

Other Cultural Points.—A few pieces of sandstone may, with advantage, be mixed with the soil. They all dislike lime in any form. High temperatures should be carefully avoided, or the plants will fall sickly, and a prey to all sorts of insect

pests. The most troublesome of the latter is thrips; for which fumigate or vaporise. Lomarias detest being syringed or watered overhead; spotted leaves and unhealthy plants are the result.



LOMARIA FLUVIATILIS.

Principal Species and Varieties :—

NOTE.—The fronds mentioned below are the "barren" fronds. The "fertile" ones are usually as long, or a little longer, much narrower, and more erect.

attenuata, fronds 1′ to 3′, st. or warm grh., deep grn., ro. flushed when young.
— heterophylla.
blechnoides, fronds 1′ to 1½′, grh.
boryana, fronds 1′ to 2′, grh. (*syns.* magellanica and zamioides).
— Dalgairnsiæ, fronds contracted.
— robusta, strong-growing.
ciliata, 9″ to 36″, fronds 8″ to 12″ long, st.; close to gibba.
— gigantea, larger fronds.
— grandis, very wide fronds.
discolor, fronds 1′ to 3′ long, 4″ to 6″ broad, grh.
— bipinnatifida, pinnæ overlapping.
falcata (*see p.* 29).
— nudapulcherrima, fronds forked.
gibba, 2′ to 3′, fronds 1′ to 3′ long, st. or warm grh. (*syn.* neocaledonica, *see p.* 29).
— Belli, prettily tasselled.
— platyptera, fronds very long and wide, no spores.
— robusta, strong growing.
— tincta, fronds tinged ro. pk. when young (*syn.* gibba rosea).
onocleoides, fronds 1′ to 1½′ long, pinnæ very narrow; an elegant plant.
procera, fronds 1′ to 3′ long, grh. (*syns.* Gilliesii and minor).
— capensis, very vigorous.
— chilensis, very vigorous.
— ornifolia (*syn.* tuberculata), much divided fronds.
— vestita, scaly fronds.
Spicant, Hard Fern, fronds 1′ to 1½′ long, 1″ broad, hdy., deep grn.; very leathery. British. (*Syn.* Blechnum Spicant). Many vars.; concinna, contracta, crispa, cristata, multifurcata, polydactyla, ramocristata, and trinervia are some of the best.

Other Species and Varieties :—

alpina, fronds 4″ to 8″ long, hlf-hdy., rather smaller than Spicant.
— ramosa, dwarf and crested.
aspera, fronds 3″ to 6″ long, grh.
Banksii, fronds 6″ to 9″ long, grh.; close to lanceolata.
capensis (*see* procera var.).
chilensis (*see* procera var.).
Colensoi (*see* Patersoni elongata).
crenulata (*see* Germainii).
cumingiana (*see* Patersoni.)
cycadoides, grh.
Dalgairnsiæ (*see* boryana var.).
discolor nuda, pinnæ narrower than in type, and less leathery.
dura, fronds 1′ to 1½′ long, hdy. (*syn.* rigida).
elongata (*see* Patersoni elongata).
filiformis, fronds 1′ to 2′ long, 3″ to 4″ broad, grh. (*syns.* Lomariopsis and Stenochlœna hetcromorpha).
fluviatilis, 3″ to 4″, fronds 6″ to 18″ long, prostrate, grh. (*see* figure).
Fraseri, fronds 1′ to 1½′ long, 4″ to 6″ broad, grh.
Germainii, fronds 2″ to 3″ long, grh. (*syn.* crenulata); close to alpina.
Gilliesii (*see* procera).
heterophylla (*see* attenuata var.).
lanceolata, fronds 6″ to 12″ long, 2″ to 4″ broad, grh.
L'Herminieri, fronds 9″ to 15″ long, 3″ to 4″ broad, st.
magellanica (*see* boryana).
membranacea, fronds 6″ to 9″ long, 1″ to 1½″ broad, grh.
minor (*see* procera).
neocaledonica (*see* gibba).
nigra, fronds 4″ to 6″ long, 1″ to 1½″ broad, grh.
Patersoni, fronds 1′ long, 1″ broad, grh. (*syn.* cumingiana).
— elongata, barren and fertile fronds 2′ or more long and pinnatifid (*syns.* Colensoi, elongata, and punctata).
pumila, fronds 3″ to 4″ long, 1″ to 1½″ broad, hlf-hdy.
punctata (*see* Patersoni elongata).
punctulata, fronds 1′ to 2′ long, 4″ to 6″ broad, grh.
rigida (*see* dura).
robusta (*see* boryana var.).
tenuifolia (*see* Acrostichum tenuifolium).
tuberculata (*see* procera ornifolia).
vestita (*see* procera var.).
vulcanica, fronds 6″ to 18″ long, 3″ to 6″ broad, st. or grh. (*see p.* 31).
zamioides (*see* boryana).

LOMATOPHYLLUM.

Stove succulents (*ord.* Liliaceæ), differing from Aloe chiefly in having berried fruits. Propagation, by offsets and by lateral shoots taken off as cuttings. Fibrous loam and peat in equal ratio, with a good admixture of sand and soft, broken, red bricks, will suit them admirably. Keep the soil rather dry in winter.

Principal Species :—

borbonicum, 3′, Je., yel., berries red (*syns.* aloiflorum and Phylloma aloiflorum).

LONAS.

A hardy, erect annual (*ord.* Compositæ). Propagation is effected by seeds in April. Any ordinary garden soil, not too heavy, will meet its requirements admirably.

Only Species :—

inodora, 1¼′, Jy., Aug., hdy., yel.

LONCHITIS.

A small genus of pretty stove and greenhouse Ferns (*ord.* Filices), with rather fleshy rhizomes. They do well planted in the fernery, are of bold habit, and their spore masses are very bright and

Lomaridium (*see Lomaria*).
Lomariopsis (*see Lomaria*).

conspicuous. Propagated by spores, which should be sown as soon as they are ripe; also by division of the rhizomes, which soon make plants if separated cleanly. Soil, two parts of peat and one part of loam, with sand.

LOMARIA VULCANICA (*see p.* 30).

Principal Species :—

pubescens, fronds 3′ to 4′, st., very woolly (*syns.* lindeniana, madagascariensis, and natalensis).

Other Species :—

occidentalis, fronds 2½′ to 4′, stipes naked. Not commonly grown.

LONCHOCARPUS.

Evergreen stove trees or tall climbing shrubs (*ord.* Leguminosæ), with unequally pinnate leaves, and violet, purple, or white flowers in racemes, or very rarely panicles. Propagation, by cuttings of half-matured shoots in a propagating case with bottom heat. Soil, fibrous loam and peat in equal proportions, with sand and charcoal to keep it porous.

Principal Species :—

Barteri, Sep., ro. pk.
cyanescens. Yoruba Indigo.
domingensis (*see* sericeus).
latifolius, 20′, st. shr., pale pur.
pubescens, 25′, pur.
sericeus, 20′.

LONDON PRIDE (*see* SAXIFRAGA UMBROSA).

LONDON PURPLE.

An arsenical preparation, used as an insecticide in combination with lime. The proportions are 1 lb. of London Purple, 1 lb. of lime, and 250 gallons of water. As the preparation is very poisonous it must be handled with extreme care. While being used it should be kept well stirred, for it does not dissolve in water. In this respect it behaves similarly to the better known Paris Green. It may be used with Bordeaux Mixture as a fungicide.

Longchampia (*see Leyssera*).

LONICERA. (HONEYSUCKLE.)

Description.—Hardy or half-hardy, erect or climbing, shrubs (*ord.* Caprifoliaceæ), which may be divided into two distinct groups according as the flowers are whorled and the fruits separate, as in the common Honeysuckle, or the flowers and fruits are in pairs like Xylosteum. The flowers are yellow, orange, pink, white, rose, purple, red, or scarlet.

Propagation.—By seeds or berries; also by cuttings taken in autumn, inserted in sandy soil, and sheltered in frames during winter. The thick and pithy-stemmed species may be layered like Carnations or Rhododendrons in autumn.

Soil.—Any good garden soil will meet their requirements; but if heavy it should be ameliorated by the use of sand, peat, and leaf mould.

Other Cultural Points.—Three at least of the species are regarded as tender, namely gigantea, hildebrandiana, and sempervirens, and are usually grown in a greenhouse. Hildebrandiana succeeds in the open in the Isle of Wight, and when sufficiently tried may be expected to do so in all the more favoured parts of the south and west coasts of

Photo: Cassell & Company, Ltd.

LONICERA SEMPERVIRENS (*see p.* 23).

Britain. Sempervirens dislikes clayey soils and the smoke of towns. It grows well in sandy peat, and as it lives and makes a fair amount of growth on a south wall in the north of Scotland, it should

succeed better in the more favoured parts of the island than it gets credit for doing.

Photo: Cassell & Company, Ltd.

LONICERA ETRUSCA.

Principal Species, Hybrid, and Varieties :—

Alberti, 3′, Je., ro.
alpigena, 6′, Ap., My., yel. An upright bush for shrubberies (*syns.* Caprifolium alpigenum and alpinum).
bella, 4′, Je., ro.; hybrid (Morrowi × tatarica).
cærulea, 4′, My., yel. Blue-berried Honeysuckle.
— glabriuscula, smooth-leaved var.
Caprifolium, 15′ to 20′, My., Je., blush, berries or. (*syns.* americana, ciliosa, grata, pallida).
— major, flowers larger (*syn.* magnevillea).
chrysantha, yel., wh., fruits red.
etrusca (*see* figure), 15′, My. or. (*syns.* atrosanguinea and gigantea).
flava, 6′ to 12′, Je., Jy., bright yel.; a very handsome but neglected species (*syns.* Caprifolium flavum and C. Fraseri).
fragrantissima, 6′ to 10′, Nov. to Feb., wh.; fragrant, winter flowering (*syns.* caprifolioides, Niaguarilli, odoratissima).
gigantea, yel., lvs. bluish.
hildebrandiana, Jy., Aug., buff to red, 6″ to 7″ long.
involucrata, 3′, Ap. to Je., yel., bracts red; very distinct species (*syns.* bordwelliana, intermedium, and Ledebourii).
japonica, 6′ to 15′, Jy., red, wh. (*syn.* chinensis).
— aureo-reticulata, lvs. netted with gold. yel. (*syn.* brachypoda reticulata).
— flexuosa, 6′ to 15′, Jy., red, wh. (*syn.* brachypoda).
Periclymenum, 15′ to 30′, Ap. to Sep., red, yel. (*syns.* Caprifolium Periclymenum and sylvaticum). The Woodbine or Common Honeysuckle.
— belgica, yel., red.
— quercifolia, Oak-leaved.
— serotina, late flowering.
sempervirens, 8′ to 20′, spr., sum., sc., yel. (*syns.* Brownii, caroliniana, fuchsioides of gardens, *see p.* 31). Trumpet Honeysuckle.
— minor, flowers smaller.
Standishii, 2′ to 10′, Feb., Mch., wh.; best on a wall for shelter when flowering.
tatarica, 4′ to 10′, Ap. to Je., pk. (*syns.* caucasica of gardens, not of Pall, and speciosa of gardens).
— albiflora, wh.
— lutea, yel.
— nana, dwarf.
— punicea, red.
Xylosteum, 5′ to 8′, Je., yel.; upright bush with grey bark.
— leucocarpum, fruit wh.
— melanocarpum, fruit blk.
— xanthocarpum, fruit yel.

Other Species, Hybrid, and Varieties :—

brachypoda (of De Candolle, *see* japonica flexuosa).
— reticulata (*see* japonica aureo-reticulata).
ciliata, 4′, Ap., wh., red (*syn.* Xylosteum ciliatum).
— alba, wh.
confusa, 15′, Je., red.
flavescens, 8′, yel. (*syn.* webbiana of gardens).
flexuosa (*see* japonica flexuosa).
floribunda, 6′, ro.
glauca, 10′ to 15′, Je., Jy., yel.
grata, 20′, Jy., red.
hirsuta, 10′, Je., yel. (*syns.* pubescens and Caprifolium Douglasii).
iberica, 6′, Ap., or.
implexa, 8′, Jy., red, yel.
— balearica, 8′, Je., cream.
Ledebourii (*see* involucrata).
longiflora (*see* macrantha).
Maackii, wh.
macrantha, 15′, Jy., or. (*syns.* longiflora and Caprifolium nepalense).
Maximowiczii, 10′, red. vio.
micrantha, pk., yel. (*syn.* tatarica micrantha).
microphylla, 4′.
nigra, 4′, Ap., yel.
— campaniflora, 4′, My., yel.
orientalis, 16′, Je., yel.
— punicea, My., crim.
propinqua, hybrid (alpigena × involucrata).
pyrenaica, 4′, wh.
splendida, yel. to wh.
tangutica, yel.
tibetica, 1½′, ro., sweet.
tomentella, 10′, Jy., pk., wh.
translucens, yel.
webbiana of Wallich (a form of alpigena).
webbiana of gardens (*see* flavescens).

Looking Glass Tree (*see Heritiera*).
Loosestrife (*see Lysimachia and Lythrum*).
Lopadocalyx (*see Olax*).

LOPEZIA.

Slender-growing annuals (*ord.* Onagrarieæ), allied to Fuchsia, with small purple, red, or pink flowers, borne in the axils of the leaves. Propagation, by seeds in the open border in April. Any good garden soil, light rather than heavy, will suit.

Principal Species :—

cordata, 1½′, Aug., pur.
coronata, 1½′, Aug., red (*syn.* racemosa).
grandiflora, 3′, Jy., Aug., red.
pumila, 6″, Aug., red.

Other Species :—

Galeottii, red.
hirsuta, 1½′, Aug., red.
lineata, 3′, Feb., ro.
macrophylla, Mch., red (*syn.* fuchsioides).

LOPHANTHUS. (GIANT HYSSOP.)

Hardy and half-hardy herbs (*ord.* Labiatæ), with blue or purple blue flowers, and resembling in habit the Nepetas or Cat Mints. All are perennials of

easy culture in ordinary garden soil, but they are seldom met with outside the bounds of botanic establishments, a certain rather weedy appearance prejudicing plant lovers against them. They may be easily increased by division of the roots in spring.

Principal Species :—

anisatus, 3′, Jy., lvs. wh., flowers bl. (*syns.* Hyssopus anisatus and discolor). Anise Hyssop.

scrophulariæfolius, 5′, Jy., pur. (*syn.* Hyssopus scrophulariæfolius).

LOPHIRA.

There is only one species in this genus (*ord.* Dipterocarpeæ), alata, the Scrubby Oak, a handsome stove tree of pyramidal habit. It may be propagated by firm cuttings, rooted in very sandy soil, or in pure sand, in bottom heat. It likes a compost of sandy loam and fibrous peat in equal parts.

Only Species :—

alata, 10′, Feb., st., yel. (*syn.* africana).

LOPHOSPERMUM (*see* MAURANDIA).

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LOROPETALUM CHINENSE (*see p.* 34).

Other Species :—

nepetoides, 4′ to 6′, Jy., pur., bl. (*syn.* Hyssopus nepetoides).

urticæfolius, 3′ to 4′, Jy., Aug., pur., wh., pk.; plant of branching habit.

LOPHIOLA.

The solitary member of this genus (*ord.* Hæmodoraceæ), aurea, is a pretty, herbaceous, yellow-flowered perennial of slender habit, hardy in most places, growing 1½′ high, blooming in July, and doing best in a rather damp and shaded situation where the soil is peaty. Division of the root, either in autumn or spring, will soon yield a stock of plants.

LOPHYRUS. (PINE SAWFLIES.)

A genus of Sawflies whose larvæ occasionally do some damage to various Conifers, particularly Firs and Larches. Sometimes they are to be found in such large numbers that whole branches are denuded of their leaves, and where this occurs on young trees the health of the plants is seriously endangered. Their habit of forming large colonies has led to the belief that they are more numerous and mischievous than they really are. Young trees only need, as a rule, to be watched, and for

Lophidium (*see Schizæa*).
Lopholepis (*see Polypodium*).
Lophosorus (*see Alsophila*).

these hand-picking is the best remedy. A forcible stream of clear water directed against any infected branches is the best way of dealing with the larger specimens.

LOQUAT (*see* PHOTINIA JAPONICA)

LORANTHUS.

A large genus of stove, greenhouse, and hardy parasitic shrubs (*ord.* Loranthaceæ). The leaves are thick and fleshy, and the flowers often highly coloured, while the fruit is a berry or drupe. Flavidus has been introduced. Propagation, by sowing the berries upon the above-ground roots of the Beech, or fixing them to its branches.

LOREYA.

Horticulturally, this genus (*ord.* Melastomaceæ) is quite an unimportant one. The plants are seldom cultivated.

LOROPETALUM.

There is only one species (two by *Index Kewensis*) in this genus (*ord.* Hamamelideæ), but it is a singularly handsome flowering tree that is in great favour with planters. Of dwarf and shrubby habit, it takes kindly to pot culture, and if potted firmly and exposed to the sun in the autumn to ripen the wood, it flowers freely and makes a highly decorative conservatory plant. It does not take kindly to forcing, but when grown under glass it should be allowed to come along naturally in a cool house. It may be propagated by seeds, when these can be obtained, or by cuttings, either in spring or autumn, in a close frame. Soil for pot plants, loam two-thirds, leaf mould one-third, and sand. Outdoors it favours a good sandy loam, in a warm and sheltered position.

Only Species :—

chinense, 4′ to 12′, aut., hdy., wh. (*see p.* 33).

LOTUS.

Description.—A large genus (*ord.* Leguminosæ), and its members vary a good deal. Some are low, prostrate herbs, others are of shrubby habit, but comparatively few are cultivated. From a garden point of view, Bertholetii is the most important; it makes an elegant basket plant for the greenhouse or cool conservatory, is of distinct appearance with its curiously shaped scarlet flowers, and is quite easy to grow. Jacobæus and Gebelia are also greenhouse perennials, but they are liable to die off during the winter, and although pretty, are not at all reliable. The common Bird's Foot Trefoil, corniculatus, is ubiquitous in British pastures. Occasionally it is cultivated, and is really a pretty plant for the rockery. The double-flowered form is, as yet, comparatively rare.

Propagation.—By seeds for the hardy species, and by cuttings for the greenhouse perennials. Sandy soil should be employed for the cuttings, and a close, but not heated, frame is desirable, if not absolutely necessary.

Soil.—Any ordinary garden soil will do; equal parts of loam and leaf soil, with a little sand, for the greenhouse plants.

Principal Species :—

Bertholetii, 2′, My., Je., grh. per., sc. A good basket plant (*syn.* peliorhynchus).
corniculatus, 3″ to 6″, sum., hdy., yel., or., prostrate.
— major, larger.
Gebelia, Je., Jy., grh. per., red, ro.
jacobæus, 1′ to 3′, sum., grh. per., pur.
peliorhynchus (*see* Bertholetii).

Other Species :—

albidus (*see* australis).
australis, 2′, Jy., grh. per., pk., wh., pur. red (*syn.* albidus).
pinnatus (*see* Hosackia bicolor).
Tetragonolobus, 6″ to 12″, Je., Aug., hdy., dark pur. (*syn.* Tetragonolobus purpureus).

LOTUS, SACRED (*see* NELUMBIUM).

LOURYA.

A stove plant (*ord.* Hæmodoraceæ) with the habit and appearance of an Aspidistra. Campanulata, the only species, has yellow and purple flowers produced in December and January, succeeded by clusters of blue berries. It may be increased by division in spring, and thrives in a mixture of loam, peat, and sand.

LOVE-IN-A-MIST (*see* NIGELLA).

LOVE-LIES-BLEEDING (*see* AMARANTHUS).

LOWIA.

Interesting, newly introduced stove perennial herbs (*ord.* Scitamineæ), somewhat like Heliconias in appearance and thriving under similar treatment.

Principal Species :—

borneënsis, yel., pur., vio., blk.; lvs. on long stalks.
longiflora, olive, pur., wh., lvs. tufted.
maxillarioides, grn., yel., flowers larger, lvs. tufted.

LOXOCOCCUS.

A genus, of one species only, of stove Palms (*ord.* Palmæ), of elegant habit, but rare in cultivation. They answer to the same cultural treatment as the Arecas and Ptycospermas.

Only Species :—

rupicola, 30′ to 40′, grh., flowers and spathe red, lvs. pinnate (*syn.* Ptycosperma rupicola).

LOXSOMA.

A genus of one species, Cunninghami (*ord.* Filices), which reproduces itself freely from spores, in a natural state, and affects a heavy, clayey loam, so that its thin, wiry roots are almost constantly moist.

Only Species :—

Cunninghami, fronds 1′ to 2½′ long, bluish grn. beneath, pale grn. above; leathery.

Lopimia (*see Pavonia*).
Lord Anson's Pea (*see Lathyrus nervosus, syn. magellanicus*).
Lord Harrington's Yew (*see Cephalotaxus pedunculata*).
Lords and Ladies (*see Arum maculatum*).
Lorinseria (*see Woodwardia*).
Lotus Tree, European (*see Diospyros Lotus*).
Lotzea (*see Asplenium*).
Lousewort (*see Pedicularis*).
Love Apple (*see Tomato*).
Love Grass (*see Eragrostis*).
Love-in-Idleness (*see Viola tricolor*).
Lowea berberifolia of Lindley (*see Rosa simplicifolia*).
Loxanthes (*see Nerine*).
Loxoscaphe (*see Davallia*).

Photo: Cassell & Company, Ltd.

LUCULIA GRATISSIMA (*see p* 36).

LUCANUS.

To the entomologist the Stag Beetle (Lucanus cervus) is interesting because it is the largest of British beetles, specimens 3″ long being quite common. To the horticulturist it is of note because its larvæ occasionally burrow in living Oaks and Willows, although they usually prefer dead wood. The beetles are furnished with very powerful jaws, and the head-processes bear some resemblance to the horns of a stag, whence the name Stag Beetle. The female is rather smaller than the male, and in both cases head, thorax, and legs are black, with dark brown wing cases bordered with black. Although plentiful in a few localities, Stag Beetles are not generally abundant, and the damage they do is comparatively small. Extracting the feeding larvæ from their lairs by means of a sharp, hooked wire is the best method of catching them where they are found to be working mischief.

LUCULIA.

Of the two species which go to make up this genus (*ord.* Rubiaceæ), one, gratissima, is a well-known greenhouse flowering shrub of great beauty. The second species, pinceana, is very close to gratissima, but, although it has larger and more fragrant flowers, it is, for some reason, not so general a favourite.

Propagation.—Cuttings of the young shoots which are beginning to get firm may be rooted with varying success if taken towards the end of June, inserted in sandy soil, and kept close in a gently heated frame. The conditions of shade and moisture must, however, be equable, and nicely adjusted, or not 10 per cent. of the cuttings will strike. Raising plants from seed finds favour in some quarters, but seedlings are often rather tardy in flowering.

Soil.—Fibrous loam and peat, in equal parts, with one-sixth sharp sand.

Other Cultural Points.—The plants must be potted firmly and well drained, as copious supplies of water are needed during the summer. Luculias, however, do best when planted out in a prepared bed, for they not only grow more strongly, but the flowers are much finer. The blooms are borne in huge trusses on the points of the young shoots. Pruning should be done in the winter, and old plants may then be cut hard back to the old wood —the spur system answers admirably. Luculias may either be grown as standards or, better still, trained to a wall. Mealy bug is the chief enemy, and the old wood should be well brushed over in winter with a solution of Gishurst Compound.

Only Species :—

gratissima, 9′ to 16′, aut., ro. (*see p.* 35).

pinceana, 9′ to 16′, aut., ro.

LUCUMA.

A large genus (*ord.* Sapotaceæ) of stove trees and shrubs of curious appearance, none of which enter into British gardening.

LUDIA.

Two species go to make up this genus (*ord.* Bixineæ). Both are evergreen stove shrubs. Cuttings of semi-matured shoots may be rooted in sand in a close propagating frame having bottom heat. Soil, loam and peat in equal parts, with sand.

Principal Species :—

sessiliflora, 8′ to 12′, Jy., Aug., yel.

heterophylla of Bory (now Aphloia mauritiana).

LUDOVIA.

Two species of stove plants (*ord.* Cyclanthaceæ) allied to Carludovica, like which they may be treated.

Principal Species :—

crenifolia, st., lvs. 1½′ long, grn., leathery; a distinct foliage plant.

LUEDDEMANNIA.

This genus of Orchids (*ord.* Orchidaceæ) was formerly included with Cycnoches. The two essential points of cultivation are plenty of water during the growing season, and a thorough rest. (For cultural details, *see* CYCNOCHES.)

Principal Species :—

Pescatorei, Jy., yel., br. (*syns.* Acineta glauca and Cycnoches Pescatorei).

sanderiana, cream, pur. blotches.

triloba, yel., br. blotches.

LUEHEA (*syn.* LUHEA).

Stove trees, allied to the Sparmannias (*ord.* Tiliaceæ), of handsome appearance, but rarely seen in cultivation. Cuttings of the half-ripened shoots may be rooted in sand in bottom heat. Soil, loam and peat in equal parts, with one-sixth sand. Of the sixteen species which have been described, probably only paniculata is in cultivation in this country.

Principal Species :—

paniculata, 10′ to 20′, st., Mch., Apr., ro., wh.

LUFFA. (VEGETABLE SPONGE.)

Tropical Gourds (*ord.* Cucurbitaceæ) of annual duration. They are remarkable for their large and curious-looking fruits, of which the inner fibrous network enclosing the seeds is dried, softened, and used as sponges in tropical countries. It forms the Luffa (or Loofah) sponges of commerce. Plants may be easily raised from seeds sown in spring in brisk heat, the plants afterwards receiving similar treatment to that accorded to Melons. When in fruit they look very ornamental depending from the roof of the stove. Soil, three parts of good loam and one part of leaf mould. Plenty of water is needed at all times.

Principal Species :—

acutangula (*syn.* fœtida of *Botanical Magazine* 1638).

ægyptiaca, fruit 5″ to 12″ long, club shaped; plant cultivated in many parts of the tropics (*syn.* cylindrica).

LUISIA (*syns.* BIRCHEA and MESOCLASTES).

Stove epiphytal Orchids (*ord.* Orchidaceæ), with cylindrical leaves, and flowers produced in clusters at the sides of the stems. They may be grown on a block of wood, packed in here and there with a little living sphagnum, or placed in shallow Teak baskets filled with crocks surfaced with sphagnum. Plenty of water is needed in summer. Propagation is by division, and by imported pieces.

Lubinia (*see Lysimachia*).

Ludisia (*see Hæmaria*).

Ludovia of Persoon (*see Carludovica*).

Principal Species :—

amesiana, Je., flowers yel., spotted br., about 1" across; habit much like Vanda teres.
Psyche, sum., grn., pur.

Other Species :—

antennifera, 1', grn., lip pur.
brachystachys, grn., ro. pur.
Cantharis, grn., pur.
macrotis, yellowish grn., lip vio.
microptera, yel., lip pur., yel.
Volucris, 6" to 10", yellowish grn., lip pur.
teretifolia, sum., pur., wh. (*syns.* platyglossa, zeylanica, and Cymbidium triste of *Botanical Magazine* 3648).

LUPINUS POLYPHYLLUS ALBUS.

LUNARIA. (HONESTY.)

Hardy annual, biennial, or perennial herbs (*ord.* Cruciferæ), two species only being known. Of these, annua, more commonly known as biennis, is the one usually grown, and under the name of Honesty it finds a place in many a cottage garden. As is suggested by its various names, it is both an annual and a biennial; annual if seed be sown early in the year, biennial if sown towards the close of the summer. Any ordinary garden soil will suit it, and young plants come up freely from self-sown seed. It is desirable, in fact, to sow the seed in the places where the plants are intended to flower. Propagation may also be conducted by root division. The flowers of annua are pretty, but it is the silvery septum (replum) of the seed pod that constitutes the chief charm. The flowering stems should be cut down when the pods are ripe, dried, and the outer portions of the pods peeled off to show the white lining within. Honesty is in great favour for winter decorations, and associated with coloured foliage, Grasses, and berries is singularly effective and lasting.

Only Species and Variety :—

annua, 1½' to 3', My., Jy., vio., lil., wh., scentless, pods round (*syn.* biennis).
— variegata, foliage margined wh.
biennis (*see* annua).
rediviva, 2' to 3', My., Je., pur., scented, pods lance shaped.

LUPINUS. (LUPINE.)

Description.—Although nearly a hundred species (*ord.* Leguminosæ) have been described, the greater part of the gardener's interest centres about arboreus, the Tree Lupine, and polyphyllus, a handsome herbaceous perennial, and its many varieties. These two plants, with their varieties, are a host in themselves, and there are few gardens without them. The flowers of polyphyllus last fairly well when cut, but they are rather too heavy in appearance to be really useful. Albus is used as a foliage plant in some parts of the Continent. Both annuals and perennials, hardy and half-hardy, are included in the genus.

Propagation.—By seed in all cases. Seedlings of arboreus and its varieties may be flowered in the second season, and they invariably make sturdy and satisfactory plants. In addition to seed sowing, the perennials may be increased by division of the roots during March and April, and after flowering. Strong clumps only should be divided, clean cuts made, and the pieces speedily replanted in specially enriched soil, otherwise division will prove more or less of a failure.

Soil.—Lupines will grow in almost any well-tilled garden soil, but they are really gross feeders, and heavy annual dressings of good farmyard manure, and frequent and copious supplies of liquid manure in dry weather, when they are pushing up their flower spikes, will be found necessary.

Other Cultural Points.—Lupines do not transplant well, as a rule; consequently they should be regarded as permanent occupants of the herbaceous border, and plenty of room allowed them in the first place.

Principal Species, Hybrid, and Varieties :—

arboreus, 4' to 6', sum., hdy., yel., lil., pur., fragrant, Tree Lupine.
— Snow Queen, wh.
atrococcineus hybridus, Jy., Aug., hdy. ann., crim. sc.; hybrid.
Cruickshankii, 4' to 5', Jy., hlf-hdy., bl., pur., yel.; regarded by some as a var. of mutabilis.
fallax, 3' to 5', hlf-hdy. shr., vio., wh., red.
Hartwegii, 2' to 3', Jy., Oct., ann. or hdy. per., bl.
— cœlestinus, 2', bl.
mutabilis, 5', Je., Aug., hlf-hdy. sub-shr., wh., bl. Versicolor is a pretty var.
nanus, 1', sum., hdy. ann., lil., bl.
— albus, wh.
nootkatensis, 1' to 1½', My., Jy., hdy. per., bl., pur., wh., or yel.
polyphyllus, 2' to 4', spr., aut., hdy., dark bl. (*syn.* macrophyllus).
— albus, 3', wh. (*see* figure).
— Foxii, 2' to 3', bl., wh.
— Purple King, 3', deep pur.
— Somerset, 2', yel.
subcarnosus, 1', Jy., hdy. ann. or per., bl., yel. (*syns.* bimaculatus, texensis, and subramosus of gardens).

Lungwort (*see Pulmonaria*).
Lupine (*see Lupinus*).

Other Species and Varieties :—

affinis, 9″, Je., hdy., deep bl.
albifrons (*see* Chamissonis).
aridus, 1′, Aug., Sep., hdy. per.
Chamissonis, 3½′, Sep., per., bl., foliage downy wh. (*syn.* albifrons).
lepidus, 6″, Aug., Sep., hdy. per., pur. bl., spotted wh.
leptophyllus, 1″ to 3′, sum., per., vio.
leucophyllus, 2′ to 3′, Je., Nov., hdy. per., pk. (*syn.* plumosus).
littoralis, Je., Oct., hdy. per., pur., bl. (*syns.* nootkatensis fruticosus of *Botanical Magazine* 2136, and versicolor of *Botanical Register* 1979).
luteus, 1′ to 1½′, Je., Aug., hdy. ann., yel. (*syn.* odoratus).
macrophyllus (*see* polyphyllus).
microcarpus, 1½′, Ap., hdy. ann., bl.
odoratus (*see* luteus).
ornatus, 1′ to 2′, My., Nov., hdy. per., bl.
perennis, 2′, My., Jy., hdy. per.
pilosus, 2′ to 4′, Jy., Aug., ann., ro., red.
plumosus (*see* leucophyllus).
Sabinii, 2′ to 3′, My., Je., per., yel. (*syn.* sabinianus).
texensis (*see* subcarnosus).
tomentosus, 4′ to 5′, sum., hlf-hdy. shr., colours various.
varius, 2′ to 3′, Jy., Aug., hdy. ann., dark bl.

LUXEMBERGIA (*syn.* PLECTRANTHERA).

Branching stove trees and shrubs (*ord.* Ochnaceæ) from Brazil. They may be propagated by cuttings of firm shoots rooted in a close frame, in sandy soil, with bottom heat. Peat and loam in equal parts, with sand, suit for compost. Rare in cultivation.

Principal Species :—

ciliosa, 8′ to 12′, sum., yel.
polyandra, yel. (*syn.* corymbosa).

LUZULA.

Perennial Grass-like plants (*ord.* Juncaceæ) of no garden value. Five or six species are natives of Britain.

LUZURIAGA (*syns.* CALLIXENE and ENARGEA).

Half-hardy branching greenhouse shrubs and sub-shrubs (*ord.* Liliaceæ), with white flowers and round berries. They may be increased by cuttings rooted in sandy peat. The plants should be grown on blocks of peat, and require plenty of moisture and shade to do well. They are rarely met with in gardens.

Principal Species :—

erecta, 1½′ (*syn.* Callixene polyphylla of *Botanical Magazine* 5192).
marginata, flowers Heliotrope scented (*syn.* Callixene marginata).
radicans, sum., flowers 1½″ across.

LYCASTE.

Description.—A group of useful plants (*ord.* Orchidaceæ), from Tropical America and the West Indies. They all have thick and firm pseudo-bulbs, and these in some species are very short, nearly all being ribbed or angled. Leaves are produced singly or in pairs (rarely in threes) at the apex of the pseudo-bulb ; they are plicate (folded), and vary in length from a few inches to 2½′, with a width of 3″ or 4″. Flowers are borne singly on stout scapes rising from the base of the bulb ; they are large, showy, and substantial, lasting a long time in good condition.

Propagation.—By division after the plants have flowered.

Lussacia (*see Gaylussacia*).

Soil.—In the matter of compost Lycastes are not nearly so fastidious as most Orchids. They will flourish in pure peat, but the stronger growers are the better for an addition of fibrous loam. Good drainage is essential.

Other Cultural Points.—A summer temperature of from 60° to 80°, with a further rise on hot days, provided air is admitted freely, will suit, while during winter 50° to 60° will be ample. The more vigorous species, like gigantea, costata, Skinneri, etc., can be grown successfully at the warmer end of a cool Orchid house all the year round. As all Lycastes have a distinct season of rest, though all are not deciduous, care in administering water when growth is in abeyance is essential, or much harm may result ; on the other hand, when growing freely, abundance of water is needed, and established plants are frequently improved by occasional doses of weak liquid manure.

Insect Pests.—Lycastes are not much troubled by insects, but occasionally scale and mealy bug find shelter between the ribs on the under side of the leaf. Regular sponging is the best remedy.

Paphinia Group.—Though included botanically with Lycastes, the Orchids generally known as Paphinias are distinct horticulturally. The scapes are pendent. Grow in suspended baskets, in the moist atmosphere of a stove, using a compost of peat and sphagnum. Shade from bright sun, and water sparingly when not growing.

Principal Species and Varieties :—

aromatica, 1′, Je., yel., or.
costata, 1½′, Jan., Feb., cream, wh.
cristata, 8″, sum., wh., br., pur. (*syns.* Maxillaria cristata and Paphinia cristata).
cruenta, 8″, spr., yel., dotted red (*syn.* Maxillaria cruenta).
Deppei, 1′, Jan. to Mch., grn., wh., yel., pur.
gigantea, 2′, aut., win., olive, pur., or.
grandis, 9″, Nov., cream, br., pur. (*syn.* Paphinia grandis).
jugosa, 8″, sum., wh., pur. (*syn.* Colax jugosus).
lanipes, 1½′, aut., grn., wh.
macrobulbon, 9″, Feb., grn., yel., or.
— Youngii, brighter but rarer.
macrophylla, 2′, win., wh., br., red (*syn.* plana).
— measuresiana, a fine form.
rugosa, 6″, sum., yel., red (*syn.* Paphinia rugosa).
Skinneri, 1¼′, aut., win., ro., wh., crim. Of this easily grown species there are numerous named vars., the chief being alba, armeniaca (apricot tinted), gloriosa, Mrs. F. L. Ames (salmon shaded), nigro-rubra, purpurata, rosea, and vestalis.

Principal Hybrids :—

Balliæ, My. (macrophylla measuresiana × Skinneri, *syn.* Lycaste G. S. Ball).
hybrida, Je. (Skinneri × Deppei, *syn.* Deppei punctatissima).
imschootiana, win., natural hybrid (Skinneri × cruenta).
Janetæ, Ap. (Skinneri × rossiana).
lucianiana, Dec., natural hybrid (lasioglossa × Skinneri).
Mary Gratrix, Ap. (Skinneri × macrophylla).
smeeana, Jy., natural hybrid (Deppei × Skinneri).
sulphurea, very rare, natural hybrid (Deppei × cruenta).

Other Species and Varieties :—

Barringtoniæ, 2′, spr., grn., yel., red.
candida, 1′ spr., grn., wh., ro.
— lawrenceana, a good var.
cochleata, 1′, My., or.
denningiana, 2′, Sep., grn., wh., br.

Deppei punctatissima (*see* hybrida).
fulvescens, 2′, aut., br., or., yel.
Harrisoniæ (*see* Bifrenaria Harrisoniæ).
lasioglossa, 1′, win., grn., yel.
leucantha, 1½′, sum., grn., br., wh., yel.
locusta, 1½′, spr., grn., wh.
— mooreana, a fine form.
mesochlæna, 1½′, aut., grn.
plana (*see* macrophylla).
schilleriana, 2′, spr., grn., wh., yel.
tetragona, 1′, sum., yel., grn., lip vio. (*syn.* Maxillaria tetragona).
tricolor, 1′, Ap., pk.
tyrianthina (*see* Bifrenaria tyrianthina).
xytriophora, 1½′, spr., grn., wh., br., yel.
Youngii (*see* macrobulbon Youngii).

LYCHNIS. (Rose Campion.)

Hardy annuals and perennials (*ord.* Caryophylleæ), of pleasing habit and with showy flowers. All the species are of remarkably easy culture, and this, in addition to their beauty, has brought many of them into high favour with hardy plant lovers. Several of the species have varieties with double flowers, and one at least of these, Viscaria splendens plena, makes an excellent early summer bedding plant. It should be planted in bold, conspicuous masses. The dwarf-growing Alpines such as Lagascæ do well in sunny nooks in the rockery. Flos-cuculi, alba, and dioica do well in the wild garden.

Propagation, by seeds for all the species. Seeds of the annuals such as Cœli-rosa should be sown where the plants are to flower, not later than the beginning of April. The double forms can only be increased by root division. Spring is the best time to divide, although it may be done after flowering.

Principal Species and Varieties :—

alpina, 6″, spr., sum., pk., tufted in habit; a good rockery plant.
chalcedonica, 1½′ to 3½′, sum., sc., in dense terminal clusters; there are both wh. and sc., single and double vars., the best being alba plena and flore-pleno.
Cœli-rosa, 1′, sum., ro., wh., or pur., ann. (*syn.* Viscaria oculata of gardens, and Agrostemma Cœli-rosa).
coronaria, 3′, Jy., red, silvery foliage. There are several vars., of which atrosanguinea, grandiflora, and hybrida splendens are the best (*syn.* Agrostemma coronaria).
dioica, 1′ to 3′, spr., aut., pur., ro.; there is a double var. Bachelor's Buttons and Red Campion. (*Syn.* diurna.)
Flos-cuculi, 1′ to 2′, sum., red. The double var. is a great favourite. Cuckoo Flower, Ragged Robin.
Flos-jovis, 1½′, Jy., pur., sc.; whole plant covered with white felted hair (*syn.* Agrostemma Flos-jovis).
fulgens, 6″ to 12″, spr., sum., ver., red.
— haageana, sc.; many shades, including wh.
— Sieboldii, wh.
grandiflora, 8″ to 12″, sum., aut., sc. (*syn.* fulgens grandiflora).
Lagascæ, 3″, spr., sum., ro.; (*syn.* Petrocoptis pyrenaica).
Viscaria, 1′, spr., sum., ro.; many fine vars., of which alba and splendens plena are the best. German Catchfly.

Other Species, Hybrid, and Variety :—

alba, 1′ to 2′, Je., Jy., per., wh. (*syn.* vespertina). White Campion.
— flore-pleno, double (*see* figure).
corsica, 2′ to 3′, sum., ann., pk. (*syn.* Loiseleuri).
Githago, 4′ to 5′, sum., ro., pk. Corn Cockle.
hybrida, 2½′ to 3′, crim. or sc. (coronaria × Flos-jovis).
Preslii, 1′ to 1½′, sum., pur.
pyrenaica, 3″ to 4″, sum., pk.
vespertina (*see* alba).

Photo: W. H. Waite.

Lychnis alba (*syn* vespertina) flore-pleno.

LYCIUM. (Box Thorn.)

A large genus (*ord.* Solanaceæ) of hardy, deciduous, climbing shrubs, often spiny. Very few of the species are of any value, and of the two or three that are grown barbarum is the only one that is at all common; it is usually met with upon house fronts, where its thicket-like growth and long, straggling shoots are sufficiently conspicuous. The flowers, although freely produced, are small. Cuttings of the ripened wood will root freely if dibbled into a bed of sandy soil in a cold frame in autumn, and kept close through the winter. Layers and suckers may also be depended upon. Any well-drained soil will suit.

Principal Species :—

afrum, 6′ to 10′, Je., Jy., hlf.-hdy., erect, spiny shr., crim. to vio.
barbarum, My. to Aug., climbing shr., pur., yel., flowers in pairs.
pallidum, 3′, grn., pur.

Other Species :—

chinense, My., pur.; close to europæum (*syn.* trewianum).
europæum, 10′ to 12′, My., Aug. erect, spiny shr., vio.
fuchsioides (*see* Iochroma fuchsioides).
trewianum (*see* chinense).

LYCOPERDON. (Puff-ball.)

Of the species that belong to this genus of Fungi (Hymenomycetes), several are common to Britain, gemmatum being the one usually met with. Giganteum is the one that generally figures in newspaper reports of mammoth Puff-balls, and frequently grows to a great size and weight. Gemmatum is usually rejected with scorn by the searcher after Mushrooms, although it is edible; giganteum is more frequently eaten, although it is only whilst it is young that it is edible. The fibrous centre of the "ball" is regarded as an excellent styptic for flesh wounds, and in many parts of the country Puff-balls are collected for this purpose. They are so common naturally that no cultivation is needed.

LYCOPERSICUM.

Although botanists recognise several species in this genus (*ord.* Solanaceæ), one only, esculentum, the popular Tomato or Love Apple, is of note. Full information will be given under the heading of Tomatoes, so there is only need for a mere mention here. Whatever poisonous properties this species may have originally possessed, they have been reduced by long years of careful cultivation, and now there is no more wholesome fruit or vegetable.

LYCOPODIUM. (Club Moss.)

Description.—Stove, greenhouse, and hardy perennial plants (*ord.* Lycopodiaceæ). To botanists they are chiefly interesting as the remains of a once extensive genus, many of whose members are now extinct. They are seldom cultivated, and appeal but little to the gardener, although several pretty plants are still available. The plant commonly spoken of as Lycopodium is really a Selaginella—S. kraussiana, which *see*. The explosive substance known as Lycopodium powder and used in scenic and theatrical effects, is borne by the plants as spores.

Propagation.—By cuttings. The tips of growing branches may be taken off and rooted in well-drained pans of fibrous peat and sand, in the same way as Selaginellas. A constant temperature of about 70°, with shade, and uniformly moist conditions, is necessary to ensure free rooting. Also by spores, sown on prepared pans of sterilised soil, kept moist in a warm, close frame.

Soil.—Fibrous peat two parts, sand one part, chopped sphagnum moss one part. A surfacing of tips of living sphagnum is also needed.

Other Cultural Points.—Plenty of water must be given during spring, summer, and autumn, but little will be required in the winter, as the moss attracts and holds the moisture of the atmosphere. Teak wood baskets, 3″ or 4″ in depth, are the most convenient receptacles, and the plants should be hung up close to the light. Shade in summer.

Principal Species :—

clavatum, 1′ to 3′ long, creeping. British Club Moss, Wolf's Claw.
Phlegmaria, 1′, st.
Selago, 3″ to 4″, erect. British Fir Club Moss.
squarrosum, 1′, st. (*syns.* Hookeri and Hippuris).

Other Species :—

alpinum, 2″ to 3″; British.
annotinum, 6″ to 8″; British.
cernuum, 8″ to 30″, st.
obscurum, hdy.; like a miniature Spruce Fir (*syn.* dendroideum).
scariosum, 9″ to 2′, grh.
taxifolium, 9″ to 12″, st.
verticillatum, 1′ to 1½′, st.; drooping.

LYCORIS.

A small genus of bulbous plants (*ord.* Amaryllideæ), needing a greenhouse temperature for the most part, although sanguinea and squamigera will grow out of doors in a dry, sheltered nook under a south wall. Aurea, the Golden Spider Lily of America, requires stove heat, and must be rested after growth has ceased. Propagation is by offsets and by seeds. Soil, equal parts of loam and leaf mould, with sand. The pots must be thoroughly drained. Several of the species have given rise to handsome varieties, which bid fair to become popular.

Principal Species and Varieties :—

aurea, 1′, Aug., Sep., st., yel, coming before lvs. (*syn.* Amaryllis aurea of *Botanical Magazine* 409).
radiata, 1½′, Je., grh., pk. or sc. (*syns.* Nerine japonica and Amaryllis radiata).
— alba, wh., yel.
— variegata, crim., wh.
squamigera, 2′, Jy., Aug., hlf-hdy., ro., lil.; fragrant (*syn.* Amaryllis Hallii of gardens).
— purpurea, 1½′, lil., pur.

Other Species and Variety :—

sanguinea, 1′ to 1½′, Jy., Aug., hlf-hdy., dull red.
— purpurea, pur.
Sewerzowii (now Ungernia trisphæra).

LYDA.

A genus of Sawflies whose larvæ work a great deal of damage to various fruit and forest trees. Pyri and nemoralis attack stone fruits generally, especially Plums, also Apples, Pears, and Thorns, whilst campestris and erythrocephala prey upon Willows, Birches, and Alders. The larvæ group themselves together in colonies, spinning a web to cover the whole colony, whilst each larva has its own particular web inside. They have no legs, but only two claspers which serve the functions of legs. Hand-picking is the best remedy, and affected leaves should be burned.

LYGEUM.

There is only one species of Lygeum (*ord.* Gramineæ), and it is a hardy perennial Grass of no particular decorative properties. Its only value is economic, since it furnishes Albardine, a principal ingredient in the making of paper. This must

not be confounded with Esparto Grass (Macrochloa tenacissima). Propagation is by root division. Any loamy soil will do, providing it be not very heavy.

Only Species :—

spartum, 1½′; a Rush-like plant, common to the seashores of the Mediterranean.

LYGODIUM.

Description.—Climbing Ferns (*ord.* Filices), suitable for the walls and pillars of the Fernery. They are of easy culture, and call for no special treatment. Lygodiums are unique among Ferns

LYGODIUM JAPONICUM (*syn.* SCANDENS OF GARDENS).

because of the long fronds, often erroneously called "stems," which grow to great lengths.

Of the species cultivated japonicum is far the most popular. Under the name of scandens many thousands of plants are grown annually for market. The true scandens is quite a different plant.

Propagation.—By spores and by division of the crowns. In the case of japonicum spores are usually relied upon, as they yield healthy and shapely plants more quickly than divisions. For the other species division is favoured; it may be practised at any time from the middle of March to the middle of September. If desired, the pieces may be started into growth in a bed of Cocoanut fibre refuse.

Soil.—A mixture of equal parts of peat, loam, and leaf mould, with enough sand to keep the whole open, will give excellent results.

Other Cultural Points.—Large specimens should always be planted out; they do much better thus than in pots, where they are apt to dwindle and weaken. Overhead waterings may be given to the plants, with the exception of venustum, through the summer months, and liquid manure once or twice a week will be found helpful.

Principal Species :—

dichotomum, st., grn. (*syns.* circinatum, flexuosum, and pedatum).
japonicum, leaflets 4″ to 8″ long, triangular, shoots 8′ to 10′, st., grh., grn. (*syns.* Ophioglossum japonicum, and O. scandens of gardens).
palmatum, fronds 3′ to 4′, hand shaped, grh., pale grn.
reticulatum, fronds bipinnate, st. (*syn.* scandens of Schkuhr).
scandens (of gardens, *see* japonicum).

Other Species :—

articulatum, grh.
circinatum (*see* dichotomum).
Forsteri (*see* reticulatum).
hastatum (*see* volubile).
microphyllum (*see* scandens var.).
scandens (of Schwartz), st.
— microphyllum, small lvs.
scandens (of Schkuhr, *see* reticulatum).
venustum, like scandens, but with larger lvs., st. (*syn.* polymorphum of Humboldt).
volubile, st. (*syn.* hastatum).

LYONETIA.

The larvæ of Lyonetia clerkella bore galleries in the foliage of fruit trees, especially Pears, Apples, and Cherries, causing the premature dropping of the leaves, weakening thus the plants. There are two broods of moths in the year, one in July and one in October. The fore wings are white, spotted brown, and the hinder ones dark grey. Spray the trees with caustic potash solution in winter (*see* INSECTICIDES).

LYONIA.

About eight species of hardy or greenhouse trees and shrubs go to make up this genus (*ord.* Ericaceæ), which is closely allied to Andromeda. Propagation is by seeds, which require careful handling, as they are very small, and by layers. Equal parts of sandy peat and loam form an excellent compost.

Principal Species :—

paniculata, 3′ to 10′, Je., hdy., wh., small (*syns.* ligustrina, and Andromeda ligustrina); frondosa is a well-marked var.

Other Species :—

ferruginea, 20′, Ap., My., grh., wh. (*syns.* Andromeda rigida).
jamaicensis, Jy., grh., wh.
ligustrina (*see* paniculata).

LYONSIA.

Twining shrubs or sub-shrubs (*ord.* Apocynaceæ), rarely grown and of little value. Cuttings of the young shoots, taken off with a heel of the old wood, may be rooted in sand in April. Soil, two-thirds sandy peat and one-third loam.

Principal Species :—

straminea, Je., grh. ev. cl., dull yel. striped.

LYPERIA.

Greenhouse herbs and sub-shrubs (*ord.* Scrophularineæ) of little garden value, allied to Zaluzianskia. They may be increased by seeds and cuttings. Soil, loam and sandy peat in equal proportions.

Principal Species :—

pedunculata, 1½′, Je., Nov., grh., sub-shr., wh. (*syn.* Buchnera pedunculata).

Lygodictyon (*see Lygodium*).

LYSIMACHIA.

A large genus of prostrate or erect herbs (*ord.* Primulaceæ), most of which are hardy, although a few need a greenhouse temperature. Several useful garden plants are to be found here; and among them Nummularia, the Creeping Jenny, and its golden-leaved forms are first favourites. They are excellent subjects for hanging baskets, and stand the smoke of towns remarkably well. Being British they are perfectly hardy, and are most useful window-box plants. Vulgaris, also a native, is common by the banks of streams, and adapts itself well to a place in the wild garden or as a marginal subject for ornamental water. All the species are easy to grow, and providing they get plenty of water ask for little further attention.

Propagation.—By division of the root in spring or autumn. Cuttings of Nummularia and N. aurea root freely at either season if given sandy soil and a shady place.

Soil.—Any ordinary garden soil will suit for the outdoor plants. For pot plants of Creeping Jenny, two-thirds of loam and one-third of leaf soil, with sand, answer well. Drain the pots freely.

Principal Species and Variety:—

[NOTE.—All hardy except where otherwise stated.]

atropurpurea, 2′, sum., dark pur., erect (*syn.* Labinia atropurpurea).
clethroides, 3′, Jy., Sep., wh., stellate, erect.
Nummularia, sum., aut., yel., trailer. Moneywort.
— aurea, golden lvs.
vulgaris, 2′ to 3½′, sum., aut., yel., erect. Yellow Loosestrife.

Other Species:—

barystachys, wh., erect.
ephemerum, 2′ to 3′, sum., wh., erect.
lanceolata. This species with its vars. is now referred to Steironema heterophyllum.
Leschenaultii, 1′, aut., hlf-hdy., car.; a pretty plant for a sheltered nook in the rockery.
Nemorum, 4″, Je., yel. (*syn.* azorica).
nutans, 2′, Jy., Aug., hlf-hdy., pur., erect.
paridiformis, sum., yel.; like Herb Paris.
punctata, 1′, Jy., Aug., yel. (*syn.* verticillata of *Botanical Magazine* 2295).
thyrsiflora (British), 1′ to 2′, sum., yel., erect; a good sub-aquatic (*syns.* capitata, and Naumburgia thyrsiflora).

LYSINEMA.

Greenhouse evergreen shrubs (*ord.* Epacrideæ). Of the five species probably only one, pungens, has been introduced, and that is rarely met with. It may be treated in the same way as Epacris.

Principal Species:—

pungens, 2′ to 3′, Mch., grh., wh., or., red (*syn.* Epacris pungens of *Botanical Magazine* 1199).

LYSIONOTUS (*syns.* LYSINOTUS, LYSIONOTHUS, and LYSIONOTIS).

Stove herbs or shrubs with violet or purple flowers (*ord.* Gesneraceæ), handsome, but little known as yet. They may be propagated by division of the roots, or by seeds sown in sandy soil in brisk heat. Loam and peat in equal parts, with sand, suit.

Principal Species:—

carnosa, shr., wh. or lil.
serrata, 1′, win., pale lavender (*syn.* ternifolia).

Other Species:—

longiflora (*see* Æschynanthus longiflora).
ternifolia (*see* serrata).

Lysanthe (*see Grevillea*).

LYTHRUM. (PURPLE LOOSESTRIFE.)

Hardy or half-hardy herbaceous plants or shrubs (*ord.* Lythrarieæ), of easy culture and showy appearance. The best known are the Purple Loosestrife, Salicaria, and its varieties rosea and superba. The species is a great feature of the river banks during the summer. Moreover, it takes kindly to transplanting, and soon establishes itself on the banks of ornamental water. Propagation is by root division, preferably when the plants are at rest. Any ordinary soil will suit, but the plants are really gross feeders, and annual dressings of farmyard manure are much appreciated.

Principal Species and Varieties:—

Græfferi, 1′ to 3′, sum., hdy., pk.
Salicaria, 2′ to 6′, Jy., Aug., hdy., reddish pur.
— rosea, ro.
— superba, ro. pur., large flowers.

Other Species:—

alatum, 1′ to 4′, sum., aut., hdy. sub-shr., pur.
virgatum, 2′ to 3′, sum., hdy., pur.

MABA.

Stove evergreen shrubs (*ord.* Ebenaceæ), propagated by cuttings under a bell-glass. Soil, fibrous peat and loam.

Principal Species:—

buxifolia, 1½′, Jy., yel.
laurina, 2′, Jy., yel.
natalensis, wh.

MACADAMIA. (QUEENSLAND NUT.)

A greenhouse evergreen tree (*ord.* Proteaceæ), propagated by cuttings of ripe young wood. Soil, peat, leaf soil, loam, and sand.

Principal Species:—

ternifolia, 30′, sum., grn.

MACARANGA.

Stove trees (*ord.* Euphorbiaceæ) forming magnificent foliage plants in a young state, the deep green leaves being very large, on long foot-stalks, and produced regularly round the stem. Propagation, by seeds, sown in heat. Soil, good loam, with a little leaf soil and sand. Abundance of heat, moisture, and light are necessary at all seasons to obtain leaves 3′ across.

Principal Species:—

porteana, 6′ to 20′, sum., flowers small, red (*syn.* Mappa porteana).

MACBRIDEA.

Greenhouse evergreen shrubs (*ord.* Labiatæ). Propagation, by cuttings of young wood in early summer. Soil, three parts fibrous loam and one part peat.

Principal Species:—

pulchra, 1½′, Jy., red, striped wh. (*syn.* pulchella).

MACFADYENIA.

Climbing shrubs (*ord.* Bignoniaceæ). Propagation, by cuttings or seeds in spring, bottom heat being necessary. Soil, peat, loam, and sand.

Principal Species:—

corymbosa, 8′, sum., st., yel. (*syn.* Spathodea corymbosa).
Dolichandra, red (*syns.* Dolichandra cynanchoides and Spathodea Dolichandra).

Maackia (*see Cladrastis*).
Macartney Rose (*see Rosa bracteata*).
Macdonaldia (*see Thelymitra*).

MACHÆRIUM.

Erect trees or shrubby climbers (*ord.* Leguminosæ), propagated by cuttings of ripened growth in sand in bottom heat. Soil, loam and peat, with sand.

Principal Species :—

aculeatum, 10′, Aug., st., wh.
firmum, 15′, young lvs. red.
robiniæfolium, 8′, Jy., st., wh.

MACKAYA.

Description.—This erstwhile monotypic genus (*ord.* Acanthaceæ) is now included under Asystasia, but the beautiful rosy lilac greenhouse shrub so

Mackaya bella.

long known as Mackaya bella will probably not become familiar to gardeners as Asystasia bella for another century.

Propagation.—By cuttings during summer, in a close frame or pit.

Soil.—Loam, leaf soil, and sand for young stock; loam two parts and dried cow manure one part for older plants.

Other Cultural Points.—To secure abundance of flowers, it is essential that this shrub be kept dry from November till April. As flowers are produced from the points of the previous season's well-ripened growths, any pruning necessary must be done immediately after flowering. Encourage new growth by syringing and ample supplies of water and liquid manure at the roots. It does well planted out in a warm greenhouse.

Only Species :—

bella, 8′, My., Je., lil., with pur. veins (now Asystasia bella, *see* figure).

Machæranthera (*see Aster*).

MACLEANIA.

Greenhouse evergreens (*ord.* Vacciniaceæ) of low or drooping habit, used for clothing lofty pillars and walls. Propagation, by cuttings of the tips of the growths in very sandy soil beneath a bell-glass. Soil, fibrous loam, fibrous peat, and sand.

Principal Species :—

pulchra, 10′, spr., yel., sc.
punctata, 20′, Nov., red, wh., yel.
speciosissima, spr., sc., yel.; fine basket plant.

MACLURA.

The only true species is aurantiaca, the Osage Orange, a hardy, deciduous tree (*ord.* Urticaceæ), which is propagated by layers and root cuttings. Soil, sandy loam. The species Plumieri and tinctoria are now transferred to Chlorophora.

Only Species :—

aurantiaca, 20′, sum., yel., grn., fruits golden. Inermis is a spineless var.

MACODES.

Beautiful little plants (*ord.* Orchidaceæ), closely allied to Anœctochilus. They are best grown in a stove, either in a case or under a bell-glass, where they can be kept continually moist. Increase is by division of the creeping, rooting stems. Plant in pans of fibrous peat, sand, and sphagnum. The flowers are small, but the exquisite colouring and veining of the leaves amply compensate for any loss in that respect.

Principal Species :—

javanica, 9″, red, wh., lvs. olive grn. (*syn.* Anœctochilus javanicus).
petola, 1′, grn., lvs. grn., gold veins.
— superba, very fine.
sanderiana, 9″, grn., wh., lvs. velvety grn., gold veins (*syn.* Anœctochilus sanderianus).

MACRADENIA.

West Indian epiphytic Orchids (*ord.* Orchidaceæ), best grown in a moist stove, in peat and sphagnum. There are few species, all more curious than beautiful.

Principal Species :—

Brassavolæ, 8″, aut., br., yel., pur.
lutescens, 6″, Nov., yel., br., pur.
mutica (now Trichopilia mutica).
triandra, 6″, spr., grn., red.

MACROGLOSSA.

A genus of moths popularly known as Hawk Moths. Stellatarum, the Humming-bird Hawk Moth, which differs from its relatives in flying by day, instead of at night, is most common. It is rarely a pest in gardens, but, on the other hand, is interesting and generally useful, for with its long proboscis it can reach the honey in long-tubed flowers, like Honeysuckle, to secure the nectar. The head of the insect is thrust as far as possible into the corolla, pollen falls upon it, is carried from flower to flower, and so pollination is secured, as some grains are sure to adhere to any ripe stigmas met with.

Macleaya (*see Bocconia*).
Macraea (*of Lindley, see Viviania*).
Macroceratides (*see Mucuna*).
Macrochilus (*see Miltonia*).
Macrochlamys (*see Alloplectus*).
Macrochordium (*see Echmea*).
Macrocladus (*see Orania*).
Macrogyne (*see Aspidistra*).

MACROMERIA.

Half-hardy evergreen shrubs (*ord.* Borragineæ), propagated by seeds and spring division. Soil, fibrous loam, peat, and sand. Winter protection is necessary.

Principal Species :—

exserta, 3′, Sep., yel.

MACROPIDIA. (Kangaroo's Foot.)

Greenhouse herbs (*ord.* Hæmodoraceæ), propagated by root division in spring. Soil, fibrous peat and loam.

Principal Species :—

fumosa, 3′, Je., yel. (*syn.* Anigozanthos fuliginosus).

MACROSCEPIS.

Shrubby stove twiners (*ord.* Asclepiadeæ), propagated by seeds or cuttings. Soil, loam, peat, and sand.

Principal Species :—

obovata, 6′, Nov., yel., br.

MACROSPHYRA.

Evergreen stove shrubs (*ord.* Rubiaceæ), propagated by cuttings. Soil, loam, a little peat, and coarse sand.

Only Species :—

longistyla, 5′, Je., wh., grn., sweet (*syn.* Gardenia longistyla).

MACROSTYLIS.

Evergreen greenhouse shrubs (*ord.* Rutaceæ), closely allied to Barosma, propagated by cuttings in late spring under a bell-glass. Soil, three parts sandy fibrous peat and one part fibrous loam. The plants are not often seen.

Principal Species :—

barbigera, 1½′, My., red.
lanceolata, 2′, spr., wh. (*syn.* barbata).
squarrosa, 2′, My., rosy red (*syn.* Diosma obtusa).

MACROTOMIA.

Hardy or half-hardy perennials (*ord.* Borragineæ), propagated by division. Soil, loam, leaf mould, and sand, in a light, well-drained position.

Principal Species :—

Benthami, 2′, sum., br., pur.
œphalotes, 6″ to 12″, yel.
echioides, 1½′, Je., yel., br. (*syn.* Arnebia echioides). The Prophet Flower.

MACROZAMIA.

Description.—Large-growing plants (*ord.* Cycadaceæ), with long, handsome, Palm-like leaves radiating from the crown of a short, thick trunk. These leaves are leathery, shiny, and last a long time. Both the male and female inflorescences are in the form of large, scaly cones. All are Australian, and succeed in an intermediate house or the cool end of a large stove, but they develop very slowly.

Propagation.—By seeds, but these are seldom obtainable. Suckers are sometimes produced, and may be removed and potted. Trunks of various sizes are occasionally imported, and as they arrive in good condition they soon push out leaves in a close, moist stove.

Soil.—Fibrous loam used in a lumpy condition, with plenty of sand, is suitable, provided good drainage is secured.

Other Cultural Points.—A fairly large supply of water is needed all the year round by established specimens. Scale is frequently a nuisance at the bases of the leaf segments and along the stout midrib; periodical sponging with a moderately strong insecticide is the best method of keeping the plants clean.

Principal Species :—

Fraseri, lvs. pendulous, pinnæ dark grn.
Hopei, 4′ to 20′, a beautiful slow-growing plant (*syn.* Denisoni of gardens).
peroffskyana, very handsome (*syn.* Denisoni, Mackleayi, perowskiana, Lepidozamia Denisoni, and L. peroffskiana).
spiralis, shining grn., very elegant (*syn.* corallipes).
tenuifolia, lvs. twisted, pinnæ long and narrow (*syn.* plumosa).

MADDER.

From early times Madder has been extensively used for dyeing, the popular Turkey-red being produced by it. Until recently, Madder was obtained from the roots of Rubia tinctorum, or Dyer's Madder, a plant widely distributed through Europe and Asia. The native Wild Madder (R. peregrina), closely akin to tinctorum, has been used to augment the supply, but beyond the first-named species, R. cordifolia, the Munjeet, or Indian Madder, was the chief source of supply. The discovery of Alizarin practically put the vegetable dye out of the market, and within ten years the imports of Madder from India declined in value from about £500,000 to £19,000 per annum.

MADIA.

Hardy annuals (*ord.* Compositæ), propagated by seeds in the spring in any ordinary soil.

Principal Species :—

elegans, 1½′, Aug., yel.
sativa, 1′, Jy., yel.

MÆRUA.

A small genus of stove or warm greenhouse shrubs (*ord.* Capparideæ), increased by cuttings of half-ripe shoots, under a bell-glass. Soil, loam, peat, and sand.

Principal Species :—

oblongifolia, 4′, Je., wh.

MÆSA.

Stove evergreen shrubs (*ord.* Myrsineæ), propagated by half-ripened cuttings under a bell-glass. Soil, fibrous loam and peat in equal parts, with sand.

Principal Species :—

argentea, 5′, Ap., wh.
indica, 4′, Nov., wh. (*syn.* Bæobotrys indica).
macrophylla, 10′, Jy., wh.
pubescens, 4′, Je., wh. (*syn.* Bæobotrys pubescens).

Macrolinum (*see Reinwardtia*).
Macronophon (*in part, see Phelipæa*).
Macronax (*see Arundinaria*).
Macropiper (*see Piper*).
Macropodia (*see Macropidia*).
Macrorhyncus (*see Troximon*).
Macrostigma (*of Kunth, see Tupistra*).

Madagascar Nutmeg (*see Agathophyllum*).
Madagascar Potato (*see Solanum indicum*).
Mad Apple (*Solanum insanum*).
Madaria (*see Madia*).
Madaroglossa (*see Layia*).
Madder (*see Rubia*).
Madeira Vine (*see Boussingaultia basselloides*).
Madwort (*see Alyssum*).
Mærlensia (*see Corchorus*).

MAGNOLIA.

Description.—A large genus (*ord.* Magnoliaceæ), of evergreen and deciduous, hardy and half-hardy, trees and shrubs, included amongst which are some of the handsomest flowering subjects of the garden. Though flowering when leafless, the beautiful stellata is one of the most valuable hardy trees that can be obtained, for it blooms abundantly in a small state, and may often be seen starring the shrubbery, or even the large rock garden, in April, its snow-white flowers standing out clearly from the naked stems. Grandiflora is also very useful, though a later bloomer, whilst soulangeana makes grand specimens.

Propagation.—By seeds sown in heat in spring. They are, however, slow in germinating, and long in attaining the flowering size. Also by layers secured in autumn and potted as soon as they are well rooted, which is frequently two, or even more, years. Others can be grafted, budded, or inarched (*see* under these headings) on such a species as acuminata.

Soil.—A deep, thoroughly drained sandy loam, enriched with well-decayed manure, leaf mould, and peat. The manure should not be in contact with the roots.

Other Cultural Points.—The finest of the hardy species—conspicua (deciduous) and grandiflora (evergreen)—like a sunny position, the latter being perhaps the noblest wall plant. Conspicua requires very slight pruning after flowering. Greenhouse species thrive under similar conditions to the hardy ones, save that they need winter protection; Campbellii requires more room than can generally be given it. Such sorts as macrophylla and stellata, though hardy, may be treated as greenhouse pot plants, the latter being charming in early spring; liquid manure is appreciated when growth is free. Magnolias are very impatient of root disturbance.

Principal Species and Hybrids :—

[NOTE.—All are hardy except where otherwise stated.]

conspicua, 25′, Feb., My., wh. (*syns.* precia, Yulan, and Yulania conspicua, *see p.* 46); several beautiful garden forms. Alexandrina is the earliest.
Campbellii, 20′, sum., grh., ro. crim.
Fraseri, 40′, Ap., My., yel. (*syns.* auricularis, auriculata, and pyramidalis).
grandiflora, 20′, Jy. to Sep., ev., wh. (*syn.* fœtida); several beautiful garden forms (*see* figure).
hypoleuca, 50′, sweet, 6″ to 7″ across; wood used for lacquer work, spr., cream.
Lennei, 15′, Ap., My., ro. pur., hybrid (conspicua × obovata discolor).
macrophylla, 30′, Jy., wh.
obovata, 8′, My., pur. wh.; numerous *syns.*
parviflora, 8′, Je., Jy., Ap., creamy wh.
soulangeana, 20′, Ap., wh., pur., hybrid (conspicua × obovata).
stellata, 6′, Ap., wh. (*syns.* halleana, Buergeria, and Talauma stellata).

MAGNOLIA GRANDIFLORA.

Other Species :—

acuminata, 60′, Je., grn., yel.; several good vars.
fuscata (*see* Michelia fuscata).
glauca, 20′, Je., wh. (*syns.* fragrans, longifolia, and virginiana).
Kobus, 30′ to 50′, Je., wh., pur. (*syn.* Thurberi).
pumila, grh., wh. (*syn.* Talauma pumila).
tripetala, 30′, My., wh. (*syns.* frondosa and Umbrella).
Watsoni, 4′, spr., grh., cream, crim. stamens (*syn.* parviflora of gardens).

MAHERNIA.

Evergreen greenhouse shrubs (*ord.* Sterculiaceæ), propagated by cuttings of young growths under a bell-glass. Soil, loam, sandy peat, and charcoal.

Principal Species :—

glabrata, 2′, spr., yel.
grandiflora, 2½′, Je., red.
incisa, 3½, Jy., yel., or.
rutila, 3′, sum., sc.

MAHONIA (*see* BERBERIS).

Magpie Moth (*see Gooseberry Enemies*).
Mahogany Pine (*see Podocarpus Totara*).

Mahogany, Red (*see Eucalyptus resinifera*).
Mahogany Tree (*see Swietenia Mahogani*).

MAHUREA.

Stove evergreen trees (*ord.* Ternstrœmiaceæ), propagated by cuttings of half-ripened shoots under a bell-glass. Soil, fibrous peat and loam.

Principal Species :—

palustris, 15′, My., pur. (*syn.* Bonnetia palustris).

MAIANTHEMUM.

A hardy rhizomatous plant (*ord.* Liliaceæ), propagated by offsets. The plants grow well in any fertile soil in partially shaded places.

Only Species :—

Convallaria, 9″, My., wh. (*syns.* bifolium, Convallaria bifolia, Smilacina bifolia, and S. canadensis).

Principal Species :—

crenata, 1′, Ap., lil. (*syns.* Arnica crenata and Gerbera crenata).

taxifolia, 1′, Jy., yel.

MAIZE.

A robust half-hardy tropical Grass (*ord.* Gramineæ), furnishing Mealies, Indian Corn, Pop Corn etc. Like many other plants which have been cultivated for long ages, the wild form of Zea Mays has long since been lost. In America its value is even greater than that of Wheat in England, but in this country it is now being used as a vegetable as well as for fodder, though English summers are not sufficiently long to ripen the seed thoroughly. For giving a tropical effect to the flower garden, both the green and variegated forms of Maize are very effective.

Seed may be sown under glass in April and the plants put out when danger of frost is over, or the seed may be sown in April or early in May in the open, selecting a warm, sunny spot. The soil must be of good depth, retentive and rich. For forage and culinary purposes the rows should be 5′ to 6′ apart, and the plants 18″ apart in the rows. The cobs are the lower or female heads, and for cooking they must be gathered before becoming hard. In America some 600 varieties are catalogued for various purposes, but suitable selections have yet to be made for this country. For general purposes Hendersoni, growing from 4′ to 5′, with green and reddish cobs, is probably the best. Variegata is useful for the flower garden, and may also be utilised for cool houses if grown in large pots—a purpose for which they might well receive more attention.

Photo: J. S. Kimble, Southampton.

MAGNOLIA CONSPICUA (*see p.* 45).

MAIDENHAIR FERN (*see* ADIANTUM).

MAIETA.

A stove evergreen shrub (*ord.* Melastomaceæ), propagated by cuttings. Soil, peat and loam, with coarse sand and charcoal.

Principal Species :—

guianensis, 2′, Jy., wh., ro.

MAIRIA.

Half-hardy herbaceous perennials (*ord.* Compositæ), propagated by seeds and division. Any fertile soil suits. Winter protection is necessary.

Maia (*see Maianthemum*).
Maidenhair Tree (*see Gingko*).
Maiden Pink (*see Dianthus deltoides*).
Maiden Plum (*see Comocladia*).
Mainea (*see Trigonia*).

Majorana (*see Origanum*).

MAKART BOUQUETS.

Bouquets consisting of dried Grasses, various species of Everlastings, leaves of Cycas, and several of the commoner Palms. The Grasses should be gathered before they are ripe, and dried in an open, airy place. Flowers of Pampas Grass and Phragmites must be gathered early, the former especially, as soot quickly mars their beauty. The value of these bouquets is much enhanced by the addition of various berries and other brightly coloured autumnal fruits.

MALABAILA.

Hardy perennial plants (*ord.* Umbelliferæ), propagated by seeds or division in spring. Any fertile soil suits.

Principal Species :—

Opopanax, 6′, Je., yel. (correctly Opopanax Chironium).
pimpinellæfolia, 2′, Jy., yel.

MALACHRA.

Stove herbs (*ord.* Malvaceæ), with white, rose, or yellow flowers, but of no particular decorative value. Probably only one species, fasciata, which bears rose-coloured flowers in August, has been introduced. This is raised from seed, and grown in sandy loam and leaf mould.

MALACOCARPUS.

This genus of one species, erinaceus, summer, yellow flowered (*ord.* Cacteæ), is now placed with Echinocactus, which *see*.

MALAXIS.

About half a dozen species of Orchids (*ord.* Orchidaceæ) are included here. The most interesting member of the genus is paludosa, a British plant, growing 3″ to 4″ high, with small, greenish yellow flowers, found growing in bogs. It should be given a corner in the bog garden.

MALCOMIA (*syn.* MALCOLMIA).

Hardy herbs, mostly annuals (*ord.* Cruciferæ) of variable habit, with white or purple flowers. The most important is maritima, the Virginian Stock, of which there are several pretty garden varieties. Seed may be sown at various times, from early spring until late summer, to create a succession of bloom. Almost any soil will do, but a light and warm medium gives the best results.

Principal Species :—

maritima, 6″ to 12″, spr., aut., hdy., lil., ro., red, or wh.; several vars.

Other Species :—

bicolor, 6″, sum., hdy., pk. and yel.
chia, 6″ to 12″, spr., aut., hdy., pur., lil.
littorea, 6″ to 12″, Je., Nov., hdy., pk., pur., large.

Malabar Leaf (*see Cinnamomum*).
Malabar Nightshade (*see Basella*).
Malabar Rose (*see Hibiscus Rosa-malabarica*).
Malachadenia (*see Bulbophyllum*).
Malachium (*see Stellaria*).
Malachodendron (*see Stuartia*).
Malaxpinæa (*see Ægiceras*).
Malay Apple (*see Eugenia Jambos*).
Male Fern (*see Nephrodium Filix-mas*).

MALLOTUS.

Greenhouse shrubs and trees (*ord.* Euphorbiaceæ) related to Ricinus. Japonicus is the only one of note; it is a doubtfully hardy plant, which may be propagated by seeds, or by cuttings of the ripened shoots under glass. Soil, sandy loam and leaf mould.

Principal Species :—

japonicus, 10′ to 15′, My., Je., hdy. or half-hdy. (*syn.* Rottlera japonica of Roxburgh).

MALOPE.

Hardy annual herbs, with large, showy flowers (*ord.* Malvaceæ), of easy cultivation in any fertile garden soil. The popular grandiflora of gardens, really a variety of the species trifida, does almost as well in the town as it does in the country. Seeds germinate freely if sown under glass in March, or in the open ground in April. In the latter case thin sowing, and the thinning out of the seedlings as soon as they are large enough to handle, is to be recommended. Many possible fine clumps of plants are spoiled by neglect in this direction.

Principal Species and Varieties :—

trifida, 12″ to 15″, Jy., Sep., hdy., pur. or wh.
— grandiflora, bright ro.
— grandiflora alba, wh.
— grandiflora rosea, ro. pk.

Other Species :—

— malacoides, 1′, Je., hdy., ro., pk., pur.

MALORTIEA.

Dwarf stove Palms (*ord.* Palmæ), of elegant habit and easy culture. The trunks are slender, and the leaves pinnate (feather-shaped) and long stalked. For planting in a Wardian case both gracilis and simplex are admirable, being slow-growing and bearing the confinement well. Propagated by seeds. Soil, three parts peat and one part sand, with free drainage and plenty of water.

Principal Species :—

gracilis, 2′ to 4′, dark grn. (*syn.* Geonoma fenestrata).
intermedia, 2′, base of fronds covered with a fibrous network.
simplex, close to gracilis.

MALPIGHIA.

Small evergreen trees and shrubs (*ord.* Malpighiaceæ). The flowers are pink or white, but the plants are very little grown. Urens, the Cowage, or Cow Itch, is noted for its stinging properties and edible fruit, and glabra furnishes the Barbadoes Cherry of the West Indies.

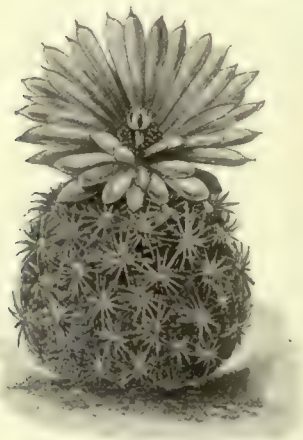
MALVA. (MALLOW.)

Hardy herbs (*ord.* Malvaceæ), annuals, biennials, or perennials, generally of rather weedy appearance. All are of easy culture in any fairly good garden soil. Propagation is by seeds, and by cuttings also for the perennials. Many of the species have emollient qualities. Moschata, the Musk Mallow, is the most ornamental, and is well worth a place in the herbaceous border, together with its white variety.

Mallet Flower (*see Tupistra*).
Mallow (*see Malva*).
Mallow, Indian (*see Sida and Urena*).
Mallow, Rose (*see Hibiscus*).
Mallow Wort (*see Malope*).
Malus (*see Pyrus*).

Principal Species and Varieties :—

Alcea, 4′, sum., per., ro. pur.
— fastigiata, 2′ to 3′, Jy., Oct., per., red (*syn.* Morenii of *Botanical Magazine* 2793).
moschata, 2′ to 2½′, sum., per., ro., about 2″ across.
— alba, pure wh., very fine.
zebrina, wh., striped pur.; a common garden plant which is probably a var. of sylvestris.



Mammillaria pectinata (*see p.* 49).

Other Species :—

campanulata (*see* Malvastrum campanulatum).
creeana (*see* Malvastrum coccineum grossulariæfolium).
crispa, 2′ to 6′, Je., ann., wh., pur.
hastata, ann., ro. vio.
involucrata (*see* Callirhoe involucrata).
lateritia (*see* Malvastrum lateritium).
mauritiana (*see* Lavatera cretica).
Morenii (*see* Alcea fastigiata).
munroana (*see* Sphæralcea munroana).
sylvestris, 1′, My., Oct., pk. or vio.

MALVASTRUM.

Greenhouse or hardy herbs (*ord.* Malvaceæ), closely allied to Malva, which *see* for culture. None of the species has any great decorative value, being too weedy.

Principal Species :—

campanulatum, 1′ to 1½′, sum., grh. per., pur. ro. (*syn.* Malva campanulata).
lateritium, 6″, aut., hdy., red (*syn.* Malva lateritia).

Other Species :—

coccineum, 6′, Jy., Sep., hdy., sc. (*syn.* Cristaria coccinea of *Botanical Magazine* 1673).
— grossulariæfolium, 2′, Jy., Oct., hdy., red (*syn.* Malva creeana of *Botanical Magazine* 3698).
Gilliesii, 6″, hdy., red (*syn.* Modiola geranioides).

MALVAVISCUS.

Greenhouse evergreen shrubs (*ord.* Malvaceæ), roughly hairy, and with red flowers. Cuttings of the side shoots may be rooted in a close frame in heat, during summer and early autumn. Soil, fibrous peat and loam in equal parts, with one-sixth sharp sand.

Principal Species :—

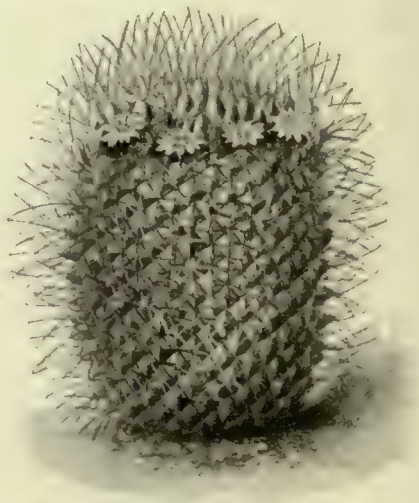
arboreus, 12′, sum., sc. (*syn.* Achania Malvaviscus of *Botanical Magazine* 2305).
mollis, 12′, aut., sc. (*syn.* Achania mollis of *Botanical Magazine* 2374).

MAMMEA.

A small but interesting group of tropical trees (*ord.* Guttiferæ), whose qualifications are almost wholly economic. The huge fruits of americana, known as Mammey, are eaten by the inhabitants of tropical America. Eau de Créole, a strong and agreeably perfumed cordial or liqueur, is distilled from the flowers of this species. Cuttings of the half-ripened shoots, from which only the lower two leaves have been cut, may be rooted in sandy soil, in bottom heat.

MAMMILLARIA.

Description.—A large genus (*ord.* Cacteæ) of interesting succulent plants. Of late years they have come a good deal into favour, and many species and varieties are in cultivation. Mammillarias are unique even among a family of curious plants. They seldom grow higher than 1′, but many of them do not exceed 2″ or 3″. The stems are round, flattened, cylindrical, or branching from the base close to the ground, as in the beautiful species longimamma. The arrangement of the spines is often so complicated as to constitute the chief beauty of the plant. Sometimes, as in pusilla, a cushion composed of tufts of white, hair-clothed protuberances is formed; in macromeris the spines become long and strong, an almost impregnable defence for the plant; or yet again, as in radiosa, they may be associated in groups, to form white, shining stars against a background of green. The flowers are not so large as those of many other Cacteæ, but are showy, usually of some shade of rose, yellow, or white, while the berry-like fruits, which are frequently borne in great numbers, often rival the superb tints of coral in their brilliancy.



Mammillaria dolichocentra (*see p.* 49).

Propagation.—Usually by seeds, of which the major portion is supplied by Continental seedsmen, many of whom have long made a speciality of this class of plants. The treatment required by the seeds does not differ from that needed by other Cacteæ (*see* Cactus). Species and varieties of tufted habit may be easily increased by division, and the tops of the stems may be cut off and rooted as

cuttings; the latter should be kept rather dry at first, or they will damp off.

Soil.—A fairly dry and porous soil is needed for Mammillarias generally. Most of them grow naturally in limestone districts, and thus a mixture of two parts sandy loam, one part lime rubble and one part crushed bricks or finely broken pots, will be found suitable for almost all.

Other Cultural Points. — Special hints have already been given under CACTUS as to the treatment of succulent plants. These may be applied to Mammillarias equally as well as to Echinocacti, Phyllocacti, etc. Most of the plants can be grown in a dry, warm greenhouse, fully exposed to the sun's rays. If they can be stood upon shelves, and near to the light, so much the better; this will economise space at the same time. Elongata and its varieties are specially suitable for window culture, being small and slow growing. Macrothele is nearly hardy, and will do well in a cold frame if protected from damp. Vivipara is quite hardy, but should be given a dry, sunny spot. Such species as pusilla and tuberculosa may be grown in an ordinary cold frame all the summer, but should be wintered in a warm greenhouse, damp being more fatal than cold. All Mammillarias should be kept drier at the root than ordinary plants. A fair quantity of water is required during the summer, but in winter little will be needed for weeks together. To keep the soil wet is the quickest way to kill the plants, particularly in the case of such beautiful, but tender, species as macromeris and Ottonis. All pots and pans should be filled half full of drainage crocks, and the soil must be made firm about the roots by means of a rammer, or the plants will not be able to support their own weight.

Principal Species and Varieties :—

barbata, globose, ro., wh., 1″across, spines wh.
bicolor, cylindrical, pur., spines yel., whole plant covered with a cobweb-like net. Nivea is a pretty var.
clava, columnar, 1′, Je., yel., spines pale br.
crassispina, columnar, late sum., red, spines whitish.
dasyacantha, globular, 2″ to 3″, ruby red, spines stellate.
dolichocentra, cylindrical, 6″ to 8″, ro. or reddish crim., spines wh. (*see p.* 48). Nigrispina and Galeottii are vars.
echinata, cylindrical, spines yel.; possibly a var. of Halei.
elegans, globose, 2″, spines wh., tipped br., (*syns.* acanthophlegma, Klugii, and Potosina of gardens).
elongata, tufted, grh., yel., fruits coral red, spines reddish yel.; suitable for frames and windows. Good vars. are densa, intertexta, rufescens, and supertexta.
erecta, cylindrical, 1′ to 1½′, My., Je., Citron yel., spines yel.
eriacantha, cylindrical, Je., Jy., yel., small, spines yel.
formosa, club-shaped, Je., red, spines tipped blk.
Grahami, globose, 3″, Je., Jy., ro.; rare.
longimamma, branching from base, 4″, sum., Citron yel.
missouriensis, globose, My., grh. or hdy., yel. or red (*syn.* Nuttallii).
— cæspitosa, bright yel.
Ottonis, nearly globose, My., Je., wh.
radiosa, My., Je., vio., spines wh., stiff, and hair-like.
— Alversoni, Foxtail Cactus, pk., long blk. spines.
— arizonica, globose, ro., outer spines br., inner wh.
rhodantha, oval, cylindrical, reddish pk. (*syn.* atrata).
— Pfeifferi, spines awl shaped, gold yel., very handsome (*syn.* Pfeifferi).
sanguinea, columnar, dark red, spines very long.
stella-aurata, branching, 2″, wh., small, spines stellate, yel.; very pretty.
sub-polyhedra, broadly cylindrical, tubercles many faced, grn., yel., red., fruit sc., spines wh.
tuberculosa, conical, 6″, My., Je., pale pur.; tubercles arranged spirally (*syn.* strobiliformis of Scheer).
wildiana, cylindrical, 3″ to 4″, ro., spines wh., yel.
Wrightii, globose, bright pur., spines wh. and reddish blk., hooked.
zuccariniana, inverted cone shaped, 3″, My., Je., bright pur., spines wh.

Other Species and Varieties :—

bocasana, globose, 2″, st., spines wh., red. There is a var. splendens.
centricirrha, depressed globose, red., car., spines yel. when young.
cornifera, globose, 3″, fruit red, spines yel. (*syns.* dæmonoceras and impexicoma).
dealbata, globular, covered woolly hairs and spines (*syn.* Peacockii).
discolor, globose, 2″, rosy pur., spines reddish.
Echinus, egg shaped, 2″ to 3″, Je., st., yel., large, spines wh., very long.
elephantidens, depressed globose, 6″, aut., vio., ro., 3″ across.
Goodrichii, ovate globose, 2″ to 3″, yel., wh., striped red, fruit sc., spines wh. and br.
haageana, club shaped, My., Jy., car. ro.
heeseana, depressed globose, car. red, longest spines of any Mammillaria, woolly when young.
Lehmanni, cylindrical, 6″, yel.
macromeris, 4″, Aug., car., very hard and woody, spines wh., blk.
multiceps, 1″, yel., lined red.
mutabilis, depressed globose, Jy., pur. (*syns.* autumnalis and cirrhifera). Var. longispina has very long spines.
neumanniana, cylindrical, 5″ to 6″, ro., spines tawny br.
odieriana, cylindrical, 3″ to 4′, reddish vio.
Peacockii (*see* dealbata).
pectinata, yel. (*see p.* 48).
phellosperma, Pear-shaped, 5′, spines blk., wh.; has never flowered in cultivation.
phymatothele, cylindrical, 5″ to 6″, Je., ro., spines wh., erect.
pulchra, oblong cylindrical, 4″ to 5″, Je., ro., spines spirally arranged.
robustispina, 1′ to 1½′ across, yel., spines very strong and blk. tipped (*syn.* Brownii).
Scheerii, 7″, yel., cream, spines br.
Schelhasii, cushion-like, sum., wh., spines wh., hair-like.
schiedeana, cylindrical, 3″ to 5″, wh., small, spines yel., stellate.
Sempervivi, Pear shaped, 4″, woolly; Caput-Medusæ is a var.
spacelata, cylindrical, 8″, My., blood red, spines ivory wh., becoming blk. with age.
tenuis, cylindrical, 2″ to 4″, My., pale yel.
tetracantha, sub-globose, 9″, Jy., bright ro.
uncinata, globose, 4″, My., Je., pur.
villifera, 3″, My., Je., ro., lined pur., spines yel.
vivipara, clustered, 3″, My., Je., pur., fruit grn., spines wh., stiff, hair-like.

MANDEVILLA (*syn.* AMBLYANTHERA).

Tall, climbing shrubs (*ord.* Apocynaceæ) requiring stove heat. The flowers of many of the species are large and showy, but as yet, sauveolens, summer, large, white, fragrant, is probably the only member of the genus familiar to cultivators. Cuttings of the stiff side shoots may be rooted in sand. Soil, good loam and fibrous peat, with sand. The plants do best when growing in a prepared border. For training to rafters and pillars in the stove, suaveolens is worthy of note (*see p.* 50).

Mammoth Tree (*see Sequoia gigantea*).
Manabea (*see Eyiphila*).
Mandarin Orange (*see Citrus nobilis*).
Mandirola (*see Achimenes*).

MANDRAGORA. (MANDRAKE.)

A small genus (*ord.* Solanaceæ), to whose members much of legendary interest is attached, although from the cultivator's point of view they are valueless. The roots of the Mandrake have been credited with various sinister qualities, and were declared at one time to shriek when being pulled out of the ground. Superstition has not yet wholly died out, for even now, slices of the curiously forked roots are occasionally sold in the streets of London as a specific for various ills, and a rich harvest is reaped from the credulous.

Mandragoras may be propagated either by seeds or by root division, and grow in any deep, fairly light soil, in partial shade.

Principal Species :—

autumnalis, 6″ to 12″, Sep., hdy. per., pale pur. Said to be the Mandrake of Scripture.

officinarum, Devil's Apples, 1′, My., hdy. per., wh. or bl. (*syns.* officinalis and vernalis).

MANETTI (*see* ROSES.)

MANETTIA (*syns.* BELLARDIA, CONOTRICHIA, LYGISTUM, etc.).

Stove, evergreen, herbaceous or shrubby climbers (*ord.* Rubiaceæ), with highly coloured, showy flowers, allied to Bouvardia. Some of the species make elegant pillar plants, and they do well if trained to balloons and spheres of wire or wood. Luteo-rubra (bicolor) is the one most frequently met with. Cuttings of the young shoots root readily in spring, in sandy soil in heat, and if potted on into a mixture of peat and loam in equal parts, with one-eighth sand, they soon make good plants. Relatively small pots only are required, as they flower best when slightly pot-bound.

Principal Species :—

bicolor (*see* luteo-rubra).

cordifolia, Aug., Nov., st., sc., very showy (*syn.* micans).

luteo-rubra, Feb., Je, st., sc., yel. (*syn.* bicolor). If planted in a border it will flower the whole year round.

MANGIFERA. (THE MANGO.)

Stove, evergreen trees (*ord.* Anacardiaceæ), which do not enter to any extent into decorative gardening, but one species, indica, is of great importance economically. It is cultivated extensively in the Old World tropics for the sake of its fruit. Occasionally plants in this country ripen their fruit, but so far the Mango Tree is only a novelty here. Cuttings of ripened shoots may be rooted in sand in strong bottom heat, but grafting is usually resorted to for the better varieties. Soil, two parts of good loam and one part of sandy peat.

Principal Species :—

indica, 60′, Jy., wh., fruits kidney shaped, yel., red, speckled blk.; many vars. Mango Tree.

MANICARIA.

Tropical American stove Palms (*ord.* Palmæ), of robust habit, rare in cultivation. They may be propagated by imported seeds, which should be sown in strong bottom heat, with plenty of moisture. A good, sandy loam suits the plants well. Saccifera, the only species of note, has leaves which are often 30′ long and 5′ or 6′ wide; it is distinct from all other Palms in that the leaves are entire. It grows 15′ to 20′ in height and has a prominently ringed trunk.

Mandrake (*see Mandragora*).
Manglesia (*see Grevillea*).
Mangostana (*see Garcinia*).
Mangosteen (*see Garcinia Mangostana*).
Mangrove (*see Rhizophora*).

MANIHOT.

Tall herbs and evergreen shrubs (*ord.* Euphorbiaceæ), of economic value only. From palmata Aipi and utilissima, Cassava or Mandiocca meal is obtained, and this is made into bread. The roots of palmata Aipi are wholesome and are used as a vegetable by the natives, but utilissima is very poisonous. The expression of the juice and the cooking of the Cassava meal, however, gets rid of the poison. The Tapioca of commerce is also furnished by utilissima, which is cultivated to a considerable extent in the American tropics on this account. In this country the plants are grown only as curiosities. Cuttings of ripened shoots may be rooted towards the end of the summer in sandy peat in a close frame with bottom heat. Peat and loam in equal parts, with one-eighth of the whole sand, make a suitable compost.

MANDEVILLA SUAVEOLENS (*see p.* 49).

Principal Species :—

Aipi (*see* palmata var.).

palmata. The species is overshadowed by its var. Aipi, the Sweet Cassava.

utilissima, 3′, Jy., st. yel. Bitter Cassava (*syn.* Jatropha Manihot of *Botanical Magazine* 3071).

Other Species :—

carthaginensis, Jy., grh. (*syn.* Jatropha carthaginensis).

MANTISIA.

Stove herbaceous perennials (*ord.* Scitamineæ), from the East Indies. They may be increased by root division in spring, and like a compost of fibrous loam and sandy peat in equal parts.

Principal Species :—

saltatoria, 1′, st., Jy., pur., yel. Opera Girls.

MANULEA.

Greenhouse herbs or sub-shrubs (*ord.* Scrophularineæ), which may be raised from seeds and cuttings in an ordinary greenhouse, using a soil of two parts loam, one part leaf mould, and sand. Only rubra is at all well known in this country.

Principal Species :—

rubra, 1′ to 2′, Ap., Sep., grh. per., gold, yel.

tomentosa, 1′, My., Nov., grh. per., or.

MANURES.

A manure is a substance containing one or more of the several ingredients of plant food. Consequently it is applied to the soil with the view, either of replacing substances which have been absorbed by, and taken away with, previous crops, or of increasing in the soil the quantity of any special ingredient that may be required. The whole question of manuring is a complex, far-reaching, and vitally important one to the cultivator and consumer, no matter whether the culture of plants in pots, or in the open field or garden, be considered. Some soils are naturally barren: these it is the mission of the cultivator to render fertile. Productive soils, on the other hand, must have their fertility maintained, and, if possible, increased, and to do this in the face of heavy and continuous cropping is often difficult.

The essential elements of plant food are ten in number, whilst four are unessential, but almost always present. In practical manuring the substances that it is found most important to replace in the soil are (1) nitrogen, in the form of soluble salts—nitrates, sulphates, etc.; (2) potash; (3) phosphoric acid, usually in the form of phosphates. A manure containing these three requisites is spoken of as an "all-round" manure, because it contains all that the plant is likely to feel a shortage of; the balance of the ten elements alluded to above are usually present in the soil in such quantities that it is not necessary to add to the store.

A manure whose chief ingredient is nitrogen is spoken of as a nitrogenous manure. Familiar examples are to be found in Peruvian Guano, nitrate of soda, sulphate of ammonia, and soot.

Potassic manures chiefly contain potash. Common examples are kainit, sulphate of potash, muriate of potash, and wood ashes.

Phosphatic manures supply the element phosphorus in some of its varied forms. Superphosphate of lime, basic slag, crushed bones, steamed bone flour, and bone meal are instances of phosphatic manures.

Nitrogenous manures have the effect of stimulating the growth of leaf and stem. Given in excess they promote rank growth, and not the production of fruit. Consequently, while they are excellent foods to apply to such things as Cabbages and Brussels Sprouts, of which it is desired to increase the top growth, it is easy to destroy the fertility of a fruit tree by their means. Moreover, it is not only a wasteful practice to apply nitrates to Cabbage-tribe crops in the fall of the year, seeing that much of the precious salts is washed away by the heavy autumnal rains, but positive harm may accrue, in that a gross, succulent growth, easily injured by frost, is the result. The proper time to apply nitrogenous manures is in the spring of the year, when the store of nitrates in the soil is not sufficient for the pressing needs of a crop.

Potash is intimately concerned, in conjunction with the green colouring matter of leaves, in promoting assimilation, or the absorption from the air of carbonic acid and the retention of the carbon. Without potassium the formation of starch and kindred compounds cannot go on, and the plant comes to a standstill and refuses to grow. As a rule, few soils are devoid of potash, but in a plant like the Potato excellent results are obtained from an augmentation of this store, in the way of manures.

The presence of phosphorus is necessary to the formation of protoplasm, which may be regarded as the life blood of the plants. There is still a good deal of mystery regarding the uses to which phosphorus is applied by the plant, but at least there is no doubt as to its vital importance as a plant food.

With the exception of carbon, all the other elements necessary to the health and existence of the plants are absorbed by the roots. Moreover, all plant food must be in a soluble form, seeing that solids cannot be taken in. This is the reason why the application of chemical manures in a dry season is not so serviceable as it is in a wet one, unless water is artificially applied; the food must be in solution before the plant can make use of it.

At one time it was thought that by analysing the ash of any given plant—that is, the residue after the volatile constituents are driven off by fire—an index to the requirements of the plant, from a food point of view, could be obtained. The substances found to be most strongly represented were to be regarded as being the most essential, and manures applied in accordance. Practically this was proved to be a quite erroneous conclusion. Theoretically also, the conclusion was unsound, because the absorption of food by the plant is chiefly a mechanical matter, and the roots exercise little or no selective power. Whatever is dissolved in the water, that they must take until they are so full that they can hold no more. Consequently, substances which further experiments have proved not to be essential, are often absorbed, and enter largely into the much-talked-of "ash" of plants.

All manures may be divided into two great sections, according to their origin, as "Organic" and "Inorganic."

Organic Manures.—To this section belong all remains of decomposed animal and vegetable organisms. Some of the most important are treated below.

Farmyard Manure.—This is the sheet anchor of the dispenser of manures. It contains, when good, all the essentials that the plant is likely to require. But farmyard manure varies greatly, and, to take one element alone, there is more available nitrogen

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Manitia (*see Globba*).
Manlilia (*see Polyxena*).
Manna Ash (*see Fraxinus Ornus*).
Manna Tree (*see Alhagi*).
Man of the Earth (*see Ipomœa pandurata*).
Man Orchis (*see Aceras anthrophora*).

in 1 cwt. of good nitrate of soda than there is in 1½ tons of the best farmyard manure. Yard dung is often deficient in nitrogen, owing to the common, but careless, practice of allowing large bodies of it to ferment in the open air for considerable lengths of time. Still, it is of great value, and when backed up by applications of chemical fertilisers (inorganic manures) the best results may be obtained. In addition to its chemical properties, it acts mechanically in adding depth and stamina to poor and hungry soils, and lightening heavy ones; moreover, it acts like a sponge, in storing large quantities of water, which may be drawn upon by crops during periods of drought.

Guano.—There are many different brands of guano upon the market. The true Peruvian Guano is composed of the excrement of seabirds, collected from their haunts in islands off the coast of South America. These layers of guano are sometimes of considerable depth, as they may represent the accumulations of centuries. Guano is a strong and forcing nitrogenous manure, that may be usefully employed in all cases where a quick top growth is required. For pot plants it is better dissolved in water than applied in the powder form. For crops out of doors it may be drilled in or scattered by hand.

Fowl Manure.—The manure from domestic fowls is of similar nature, and may be used in the same way. It should be stored in a dry shed with an equal bulk of dry soil, and twelve months' storage before use is an advantage, as the ranker, noxious vapours are thus got rid of.

Blood.—Dried blood from slaughter houses is a strong nitrogenous manure, although it varies considerably according to the animals which furnish it, and their condition when killed. Apply in small doses, mixed with dry soil, and in the growing season only, not in autumn or winter.

Bones.—The composition of bone meal is similar to that of superphosphate of lime, and the two may be used in similar cases. Bone meal is quicker in its effects than crushed bones, which give up their goodness slowly in proportion to their size. Crushed bones may be used for Vine borders where lasting properties are required. Bone meal forms an admirable dressing at the rate of 3 oz. to 4 oz. per square yard, for all fruit trees. Fork it in and follow up with a good watering.

Fish.—Decaying fish is frequently employed as manure. It is also worked up into a guano which is excellent for all green crops out of doors, and many pot plants, but it needs to be covered with soil to get rid of the odour.

Horn Shavings.—These contain some manurial properties, and may be usefully employed for fruit trees.

Leaves.—These not only contain a good deal of available plant food but they improve the soil mechanically. (For further details, *see* LEAF MOULD.)

Miscellaneous Garden Refuse.—The remains of garden herbaceous plants may be stacked in alternate layers with lime, and covered with soil, when they form a useful manure. If woody, destruction by fire is necessary, and the resulting wood ashes constitute a valuable supply of potash.

Night Soil.—Human excrement is a strong and forcing manure which must be employed with great care. It should be mixed with four or five times its bulk of soil, and this will, in a measure, correct the rank smell which is its chief fault. Quicklime has been recommended as a deodoriser, but its addition means the loss of so much ammonia, the most important manurial agent, that it is not to be entertained by the practical student of the problem of manure giving. Fruit trees, particularly Vines, that are carrying heavy crops will benefit from a dressing of night soil, and in some parts of the country growers of large Onions are very partial to it. Small doses only should be given to the Onions, or the bulbs will tend to become thick necked.

Cow Dung and Horse Droppings.—Cow dung is a mild but effective manure, one of its chief advantages being the great quantity of water it contains. It may be freely used for almost all vegetables, and is especially suitable for Celery, Peas, Beans, and Greens of all sorts. Stacked in alternate layers of loam, and allowed to remain thus for a year, it makes a valuable potting medium, and may then be safely employed for many kinds of pot plants, notably Ferns and Palms. It suits such aquatics as Nymphæas exceedingly well, although where these are grown in tanks under glass the cow dung should not be fresh from the byre. (For its employment in liquid form, *see* LIQUID MANURE.)

Horse droppings are the driest of all animal ordure, and may therefore be usefully employed to lighten heavy land. For making up Mushroom beds the value of horse droppings is well known, and after they have served for growing Mushrooms they are still available for putting upon the land, either as a dressing to be dug in or as mulchings; also they may be advantageously mixed with soil for potting, in proportions varying from one-fourth to one-sixth of the whole bulk. Carnations, Coleuses, Fuchsias, and Geraniums take very kindly to old Mushroom bed manure in the soil.

Soot.—This familiar article is not only valuable because, as a rule, it can be easily obtained, but also because it is a nitrogenous fertiliser. Used for Chrysanthemums it imparts a wondrous depth of green and vigour to the foliage, and it is one of the finest lawn dressings available. In the latter case it should only be applied in showery weather or the grass will "burn." Use enough to coat the grass with a black covering. (For the employment of soot in the liquid form, *see* LIQUID MANURE.) As an insectifuge and slug deterrent soot has claims upon the gardener, but a certain greasiness that it possesses renders it imperative that it should be washed off as soon as possible, or it will choke the breathing pores of the leaves, and hinder their proper working. Do not mix soot and lime, or loss of ammonia results.

Charcoal is chiefly of service as a deodoriser, and it will be well to include a little of it in the soil of all plants that need a great deal of water, and that are to stay in the same pots for a protracted period. Home burnt charcoal may be obtained by building a pyre of wood, surrounding it completely, save a hole in the top, with thick turves, and allowing it to smoulder away gradually. After the fire has burnt through to the top the orifice should be closed and the fire left to go gradually out. Charcoal dust has been recommended as a specific for Onion fly.

Malt Dust.—If kept dry, and used while it is yet fresh, this has gentle manurial properties. It is of service as a top-dressing for fruit trees.

Seaweed or Kelp.—Where obtainable this is an excellent manure for light soils. It suits both Beet and Asparagus especially well.

Liquid Manure.—For pot plants particularly, liquid manure is of the greatest service. Whatever it is prepared from, it should be clear and free from all sediment, otherwise the latter will form a crust upon the surface of the soil, which, hardening as it dries, will prevent aëration, and many of the tender roots will suffer as a consequence. Sheep droppings and cow manure make excellent liquid if placed in a coarse canvas bag and soaked for three or four days in a tub of water. Horse droppings may also be treated thus, but the liquid

MARANTA MASSANGEANA.

is rather strong in proportion to its depth of colour. The liquid that has drained from the farmyard manure heap may be watered down until it is a light brown colour, and it then forms an excellent stimulant for Roses, increasing the vigour of the plants and putting more colour into the flowers. Soot water may be prepared in a similar way to liquid cow manure. Used at a strength that gives it a light brown hue, it may be applied with safety to almost all pot plants, especially Chrysanthemums.

Inorganic Manures.—These are all of mineral origin and include all the substances, with some others, that are commonly spoken of as "artificial" or "chemical" fertilisers. These have already been treated under the heading of ARTIFICIAL MANURES.

MAPANIA.

A genus (*ord.* Cyperaceæ) of stove perennial herbs, some of which grow to a great height. Only two species have, so far, been introduced, and neither of these is of any striking horticultural value, but they are quite new to cultivation. They may be treated in the same way, both for soil and propagation, as the popular stove Cyperuses.

Mapa (*see Petiveria*).

Principal Species :—

humilis, lvs. 10″ to 20″ long, including petioles (*syns.* lucida, Wendlandii, and Pandanophyllum Wendlandii).

MAPLE (*see* ACER).

MARANTA.

Stove herbaceous perennials (*ord.* Scitamineæ), with tuberous or creeping rhizomes and prettily marked foliage. Several species are to be found in ordinary collections of stove plants, although the plant most favoured, zebrina, is a Maranta no longer, but a Calathea. Economically, the genus is likewise of some importance, for Arrowroot is obtained from the tuberous rootstocks of several of the species.

Propagation.—By division early in the year, just as the plants show signs of starting. The cuts should be made with a sharp knife, for bruising causes subsequent decay. Pot the divisions into small pots, with rather sandy soil, and plunge them in a close frame with bottom heat. As soon as root action is vigorous, they may be removed to the open stove.

Soil.—Two-thirds good loam, one-third leaf mould, and enough sharp sand to keep the whole friable.

Other Cultural Points.—The potting should only be fairly firm, especially for young plants. Plenty of water is needed at all times, and thus the drainage must be free. Marantas also do well planted out in prepared borders, the only danger being rot in the winter, from a moisture-laden, stagnant soil. Thrips and red spider are the chief insect enemies. They may be destroyed by the sponge, the use of which is very easy upon the broad, stout leaves. As the flowers are not ornamental, they should be removed as soon as seen, before they weaken the plants.

Principal Species and Varieties :—

arundinacea, 6′ to 10′. Indian Arrowroot.
— variegata, lvs. 10″ to 16″ long, including petioles, striped grn., wh.
bicolor, 1′, pale grn., spotted dark olive. Makoyana is a var.
Chantrieri, lvs. 1′ to 1½′ long, greyish grn., banded dark grn.
fascinator, dark grn., wh. upper surface, pur. lower.
major, 3′, grn., good for house decoration (*syn.* Ichnosiphon leucophæus).
massangeana, olive grn., wh. veins (*syn.* Calathea massangeana, *see* figure).
sagoriana, pale grn., barred obliquely dark grn.

Other Species and Varieties :—

albo-lineata (now Calathea albo-lineata).
amabilis (*syn.* Calathea amabilis).
angustifolia (now Stromanthe Tonckat).
argentea, silver grey, dark grn.
asymmetrica, lvs. one-sided.
chimboracensis (now Calathea chimboracensis).
concinna (now Calathea leopardina).
conspicua, dark grn., banded yel., grn.
coriifolia (now Calathea ornata).
depressa, pale grn., blotched br.
gratiosa, silver grey, banded dark grn.
iconifera, yel., grn., blotched deep grn.
kerchoveana (*see* leuconeura).
Leonæ, grn., grey.
leptostachya, grn., banded grn., wh.
leuconeura, 6″ to 8″, grn. above, pur. beneath (*syns.* kerchoveana,

Mappa (*see Macaranga*).
Maraja Palm (*see Bactris Maraja*).

Kercheovei of gardens, and Calathea kerchoveana).
Mazellii, grn., banded grey.
minor, grn., blotched br.
musaica, lvs. 7″ long, grn.
polita, lvs. 4″ to 6″, grn., blotched dark grn.
porteana (*see* Stromanthe porteana).
smaragdina (now Calathea smaragdina).
undulata (now Calathea undulata).
zebrina (now Calathea zebrina).

MARASMIUS.

Mushrooms with rather tough and leathery parts, quite common in Britain and on the Continent. Oreades, the principal species, is well known as the "Fairy-ring Fungus" of lawns and meadows. It has a very delicate flavour, and is a wholesome article of food. In this country it is not often eaten, although in parts of Kent, where its merits have become known, it is alluded to as the "Champillion," obviously a corruption from Champignon. It is about 3″ high, and the pileus or cap is from 1″ to 1½″ across, and umbrella shaped. The gills are creamy white.

MARATTIA.

Description.—Tropical Ferns (*ord.* Filices) of great size and stately habit. Naturally they are found in marshy districts, and under cultivation require to be treated almost as sub-aquatics, in order to keep them healthy. It is desirable that the pots should stand in about 6″ of water, or there is considerable labour needed in watering during hot weather. The genus is closely allied to Angiopteris, and, like the members of that genus, the plants are only suitable for large houses, where they can be given plenty of head room. Marattias are interesting, apart from their decorative qualities, because in New Zealand, the West Indies, and Brazil the fleshy crowns are frequently cooked and eaten. They are said to be wholesome and nourishing, although of peculiar flavour.

Propagation.—Spores, although freely produced, rarely germinate, and increase is usually effected by detaching the plump basal scales from the frond stems, and laying them on a moist bed of sphagnum, in heat. These scales soon send out roots, as well as bulb-like side growths, which ultimately form plants.

Soil.—Three parts of good loam and one part of cow manure, with a little road grit. The loam and cow dung should be stacked together for six months before it is used.

Other Cultural Points.—Fraxinea elegans is the only Marattia that will do in a cool house; the others all need a warm one. Where plants have been allowed to flag from want of water, a good soaking and rather heavy shade for three or four hours will put matters right, but flagging two or three times repeated means a crippled plant. Liquid manure during summer is helpful, and soot water is an excellent stimulant; none is wanted in winter. Bug, scale, and thrips are the chief insect enemies—sponge for the first two, fumigate lightly twice or thrice for the latter.

Principal Species and Varieties :—

alata, fronds 4′ to 6′, st. (*syn.* Gymnotheca alata).
Ascensionis (*see* fraxinea purpurascens).
attenuata, fronds 3′ to 5′, tripinnate, warm grh. — Moorei.
fraxinea, fronds 6′ to 15′, bipinnate, st. (*syn.* sorbifolia). There are several vars., of which purpurascens and elegans (a capital cool-house plant) are the best. Salicifolia and sambucina are others.
Kaulfussii, fronds 3′ to 4′, quadripinnate, st.
purpurascens (*see* fraxinea var.).

Other Species :—

Burkei, fronds 1′ to 3′, tripinnate, st.
cicutæfolia, fronds 5′ to 6′, st. (*syn.* verschaffeltiana).
Cooperi (*see* attenuata).
elegans (*see* fraxinea var.).
laxa, fronds 3′ to 6′, st. (*syn.* Gymnotheca laxa).
salicifolia (*see* fraxinea var.).
sorbifolia (*see* fraxinea).
verschaffeltiana (*see* cicutæfolia).

MARCGRAVIA.

An interesting genus of stove climbing epiphytic shrubs (*ord.* Ternstrœmiaceæ). The inflorescence is pendulous, and the flowers hang upside down. Honey and humming birds, while drinking the nectar, brush against them, and so pollinate them. Umbellata has shoots of two kinds, as in the common Ivy. This is the only species in cultivation, though several species of Pothos and Monstera have been wrongly referred to Marcgravia. Even umbellata is of very little horticultural value.

MARCH MOTH.

A rather common moth (Anisopteryx æscularia), closely related to the destructive Winter Moth (Cheimatobia brumata). The perfect insects appear in early spring, the males alone being winged. The female is dun brown, and about 1″ in spread of wings. The larvæ prey upon many fruit trees, but chiefly Plums and Apples. The pupæ hibernate in the ground. Grease-banding the trees is to be commended, and this should be followed up by spraying with Paris Green, 1 oz. in 20 gallons of water, as soon as the flowers have dropped. The March Moth and the Winter Moth are frequently found together, and the same treatment will do for both.

MARGUERITES.

Under this popular title many plants with large, Daisy-like flowers are grouped, but for garden purposes the undermentioned are best known. The Great Pyrenean Daisy (*see* Chrysanthemum) is Chrysanthemum maximum, and is a hardy herbaceous perennial of very easy cultivation. It should have a rich, moist, deep soil, and be divided yearly, as it increases with great rapidity. The Ox-eye Daisy of English meadows is Chrysanthemum Leucanthemum, and whilst considered by some to be too common for the garden, is worthy of attention. The Great Ox-eye Daisy of gardens is Chrysanthemum (sometimes called Pyrethrum) uliginosum. This is especially valuable, as it flowers during September and October. It grows to a height of 4′ or more, and requires the same treatment as maximum. The Yellow Marguerite of window-box fame is Chrysanthemum frutescens variety, and requires to be protected during the winter. Cuttings may be taken in the autumn or spring and given the same culture as Zonal Pelargoniums (Geraniums). Etoile d'Or is a pale flowered variety. Chrysanthemum anethifolium and frutescens furnish the greenhouse White Marguerites. The former has glaucous, finely divided leaves, and flourishes under the same treatment as accorded to the Yellow Marguerite. The Blue Marguerite is Agathæa cœlestis, which *see*. This, in addition to being a good greenhouse plant, is also available for summer bedding, and may be utilised in a similar way to the White Marguerites.

Marcgravia paradoxa (*see Monstera acuminata*).
Mare's Tail (*see Hippuris vulgaris*).

MARGYRICARPUS. (Pearl Fruit.)

A small and unimportant genus of stiff-habited shrubs (*ord.* Rosaceæ), with small flowers and variously shaped leaves. Setosus is the only species of note; it is a pretty little hardy, white-fruited evergreen, of dwarf habit, that does well on a sunny rockery. Propagation, by cuttings, which should be taken in summer and rooted in a bed of sandy soil in a close frame; also by layers. The soil should be light and rich.

MARIANTHUS.

Greenhouse shrubs (*ord.* Pittosporeæ) often with twining branches, closely allied to Billardiera.

Marica cœrulea.

Cuttings of the half-ripened shoots may be struck in sand, under a bell-glass, in bottom heat. Soil, loam and fibrous peat in equal parts, with sand. Marianthuses take kindly to wooden trellises.

Principal Species :—

cœruleo-punctatus, 4′, Ap., grh., greyish bl., petals spotted blk.
drummondianus, grh., lil.
ringens, Nov., grh., red, showy (*syn.* Calopetalon ringens).

MARICA.

Stove and greenhouse herbaceous perennials (*ord.* Irideæ), resembling Iris in general appearance, and with showy but fugitive flowers. They are all easy to cultivate, and may be increased by division of the rhizomes, in spring or after flowering. These divisions should be started in a close frame. Soil, turfy loam, leaf mould, and coarse sand. Plenty of water is needed. For planting in rockeries under glass, Maricas have much to recommend them, and appear better than in pots.

Principal Species :—

brachypus, 1½′, st., yel., barred br., red (*syn.* Cypella brachypus).
cœrulea, 2′ to 3′, My., Je., st., bl., yel., barred br., or. (*syn.* Cypella cœrulea of *Botanical Magazine* 5612, *see* figure).
lutea, 6″, Ap., warm grh., yel., wh., barred grn. (*syn.* humilis lutea of *Botanical Magazine* 3809).
northiana, 4′, Je., st., wh., yel., mottled red, rare in cultivation (*syn.* vaginata).
— splendens, larger and richer flowers than type.

Other Species :—

californica (now Sisyrinchium californicum).
gladiata (now Bobartia gladiata).
gracilis, 2′, sum., grh., wh., bl., spotted br.
humilis, st., wh., bl., barred yel., br.
— lutea (*see* lutea).
longifolia, 1′ to 1½′, st., yel., barred br. (*syn.* Cypella longifolia).
plicata (now Eleutherine plicata).
striata (*see* Sisyrinchium striatum).
vaginata (*see* northiana).

MARIGOLD (*syn.* Marygold).

A popular name applied to several plants. The true Marigold is Calendula officinalis (which *see*), a hardy annual that is a troublesome weed in many gardens. The Marsh Marigold is Caltha palustris. The favourite African and French Marigolds belong to the genus Tagetes (which *see*). Seeds of African and French Marigolds may be sown in March under glass in heat, the seedlings being next transferred to boxes, hardened off, and planted out in the open about the end of May. Or the seed may be sown out of doors, in a warm border, early in April, the seedlings being thence transferred to their flowering quarters, but these are later in flowering. For bedding purposes, the plants may be from 9″ to 12″ apart each way for the French, with a little more for the strong-growing Africans. The soil should be light and rich, and manure water will increase the size and brilliancy of the flowers. The pungent odour that characterises all parts of the Marigold plant renders the flowers unsuitable for cutting, but, out of doors, there is nothing showier, and the plants do almost as well in town as in country gardens. The tall Orange and Lemon Africans will do for herbaceous borders, but the dwarf forms of each are better for bedding. French Marigolds may be had in orange or light yellow self colours, or prettily striped and blotched dark chestnut. The miniature forms are excellent for edgings. All these are double flowers, but the single French Marigolds are worthy of mention. There are several varieties, all neat of habit and free flowering, and Legion of Honour, bright yellow, blotched brown, and Silver King, pale yellow, are two of the best. A packet of seed of single French, mixed, will give a charming variety, and the same may be said of mixed seed of the double flowers

MARILA.

Stove evergreen trees and shrubs (*ord.* Ternstrœmiaceæ) but little known to cultivators. They may be increased by cuttings of the half-ripened shoots, struck in sandy soil in bottom heat. Soil, peat and loam in equal parts, with one-sixth sand. Probably only one species has been introduced.

Principal Species :—

racemosa, 15′, st., Aug., grn., wh., in small racemes.

Marialva (*see Toromita*).
Marica (*of Schreber, see Cipura*).
Mariposa Lily (*see Calochortus*).

MARISCUS.

A large genus (*ord.* Cyperaceæ), but horticulturally an unimportant one. Umbilensis (*syns.* Cyperus natalensis of gardens, and umbiliensis) may be treated in the same way as Cyperus alternifolius.

MARL.

A clayey soil which contains a considerable quantity of carbonate of lime. When cultivated, a marly soil is fertile, but in periods of wet weather its greasy, slimy nature renders it exceedingly difficult, if not impossible, to work. Marl is occasionally employed as a dressing for land deficient in lime.

MARLEA (*syns.* PSEUDALANGIUM, RHYTIDANDRA, STYLIDIUM, and STYLIS).

Greenhouse trees and shrubs (*ord.* Cornaceæ) with white or yellow flowers in clusters borne in the axils of the leaves. Of the four or five species included, one only, begoniæfolia, is at all well known. It may be increased by cuttings of side shoots, rooted in sand in a close, warm frame, and likes a compost of peat and sandy loam in equal parts.

Principal Species :—

begoniæfolia, 60′, sum., grh., yel., wh., a tall ev. tree.

MARROW, VEGETABLE (*see* CUCURBITA PEPO for species and VEGETABLE MARROW for culture and varieties).

MARRUBIUM. (HOREHOUND.)

There are upwards of thirty species in this genus (*ord.* Labiatæ), but one only, vulgare, is of moment. This is a useful herb, described under HOREHOUND (which *see*). Most of the Marrubiums are woolly, and the flowers are some shade of white and pink. Propagation, by cuttings and root division, for all are hardy perennials. Ordinary garden soil.

MARSDENIA (*syns.* LEICHARDTIA and SICYOCARPUS).

Stove, greenhouse, and half-hardy twining or sub-erect shrubs (*ord.* Asclepiadeæ). The flowers are pretty, rather smaller than those of Stephanotis, but the plants are not common in cultivation. Cuttings may be rooted in sand under a bell-glass, in heat, during April and May. Soil, two parts loam, one part leaf mould, and enough sharp sand to render it porous.

Principal Species :—

Cundurango, sum., st. cl., wh. (*syn.* Gonolobus Cundurango).
erecta, 3′ to 20′, Jy., hlf-hdy. sub-erect shr., wh., fragrant.
loniceroides, 6′, aut., st. erect shr., red (*syn.* Harrisonia loniceroides of *Botanical Magazine* 2699).
suaveolens, 2′ to 3′, Jy., grh. shr., wh., fragrant.

Other Species :—

flavescens, Je., Jy., st. cl., yel.
maculata, 20′, Je., Aug., st. cl., red.
tenacissima, grh. cl. shr., grn., yel.

Marjoram (*see Herbs and Origanum*).
Marmalade Plum (*see Lucuma*).
Marquisia (*see Coprosma*).
Marrubiastrum (*see Siderites*).

MARSHALLIA (*syns.* PERSOONIA, of Michaux, Therolepta, and Trattenika).

Hardy perennial herbs (*ord.* Compositæ), with rose or purple flowers resembling those of a Scabious. Seeds may be sown out of doors on a warm border, about mid-April. A light garden soil is to be preferred.

Principal Species :—

cæspitosa, 1′, Je., hdy., bl., wh., heads 1½″ across.

MARSILEA.

A small genus (*ord.* Marsileæ) of greenhouse sub-aquatics, interesting to the botanist as link plants, being closely related to the Ferns, and always included in the plants spoken of as "Fern Allies," along with the Equisetums, the Selaginellas, and the Lycopodiums. The spore cases (sporangia) are edible, and are occasionally used by the natives of Australia as food. The plants may be grown in pots in loam and leaf soil, their chief requirement being plenty of water at all seasons. If they can be stood in water, so much the better. The resemblance of the silky fronds to Trifolium leaves causes them to be frequently mistaken for Shamrock. The plants may be increased quite readily by division.

Principal Species :—

Drummondii, 4″ to 8″, grh., leaflets thickly clothed with silky hairs (*syn.* macropus). Salvatrix is a var. of Drummondii.
hirsuta, 4″ to 7″, grh.
quadrifolia, a hdy. creeping aquatic.

MARTINEZIA (*syn.* AIPHANES).

Rather dwarf-growing stove Palms (*ord.* Palmæ) of elegant appearance. The leaves are pinnate, and the pinnæ wedge shaped, with jagged margins. Propagation, by imported seeds. Soil, sandy loam and peat in equal proportions. Plenty of heat and an abundance of water, both at the root and in the atmosphere, are necessary. Liquid cow manure is the best stimulant. Potting should be firm, to retain the plants in small pots, and enhance their decorative value.

Principal Species :—

caryotæfolia, lvs. 3′ to 4′ long, dark grn., spines blk. The handsomest of all.
erosa, stem and lvs. covered with strong, needle-like br. spines, leafstalks mealy.
granatensis, spines ½″ to 1″ long, br., usually bent.
lindeniana, 16′, bright grn., spines blk.

Other Species :—

Aiphanes, 30′, lvs. 5′ long (*syn.* Aiphanes aculeata).

MARTYNIA.

Greenhouse annuals or perennials (*ord.* Pedalineæ), with tuberous rootstocks. Fragrans, commonly cultivated, is an annual with large, showy flowers, and of easy culture in a greenhouse. Seed should be sown in spring in a gentle heat, the seedlings being potted on in a mixture of

Marsh Beetle (*see Typha latifolia*).
Marsh Cinquefoil (*see Potentilla*).
Marsh Fleabane (*see Pluchea*).
Marsh Mallow (*see Althæa*).
Marsh Marigold (*see Caltha*).
Marsh Trefoil (*see Menyanthes trifoliata*).
Marsh Valerian (*see Valeriana dioica*).
Martagon (*see Lilium Martagon*).
Martensia (*see Alpinia*).

equal parts of loam and leaf soil, with sand, until they are in 6″ pots, which size will be large enough to accommodate fine specimens. The size and colour of the flowers may be improved by liquid manure twice a week when the plants have filled the pots with roots, not before. Fragrans also makes a pretty border plant, if planted out about the middle of June.

Principal Species :—

fragrans, 2′, sum., aut., grh., crim. pur., rather straggling, fruit two-horned, may be pickled when young in vinegar, and eaten.

MASDEVALLIA.

Description.—A genus of a hundred or more plants (*ord.* Orchidaceæ), of dwarf, close-growing, tufted habit. The leaves are stout and leathery, and though they vary in size, their form is almost always a modification of the lance shape. The flower spike springs from the base of the leaf stalk, and though slender, it is usually wiry. In the majority of cultivated species only one flower is borne on each scape, but in some, as in the popular tovarensis, two, three, or more are produced, and in some others there is even a slender racemose inflorescence. The flowers are very distinct in form, the three sepals being attractive instead of the lip and petals, which are quite insignificant, so that the flowers assume a more or less triangular shape, with the points extended to form tails. The colouring is often very bright, and Masdevallias are among the most effective of Orchids. One section of the genus has drooping or depending spikes.

Masdevallia shuttryana (*see p. 58*).

Distribution.—Masdevallias are wholly American, being found at high elevations on the Andes, from Mexico to Peru, where the atmosphere is rare, cool, and always at saturation point.

Compost.—Whether found on rocks or on tree stems, Masdevallias naturally need very little material about their roots, consequently, under

Other Species :—

diandra, 2′, Jy., grh. ann., wh., red.
lutea, 1′ to 2′, Aug , grh. ann., or. yel.
proboscidea, 1′ to 3′, Jy., grh. ann., vio., wh. (*syn.* annua). Will flower for several months if planted out.

MARVEL OF PERU (*see* Mirabilis Jalapa).

MASCARENHASIA.

Stove trees and shrubs (*ord.* Apocyneæ), with large flowers. Cuttings of the young shoots may be rooted in spring, in sandy soil, with brisk bottom heat. Soil, fibrous peat, loam, and sand. The plants may be treated generally like Dipladenias.

Principal Species :—

curnowiana, Aug., st., sc., a rather frail-looking shr.

Marumia (of Reinwardt, see Sauravia).
Marygold (see Marigold).

cultivation, a little light, fibrous peat and live sphagnum will be suitable, with the necessary drainage material. Members of the Chimæra group are best grown in baskets without crocks, so that there may be nothing to impede the downward course of the flower spikes.

Propagation.—This is easily effected by division, either in summer (June or July) or early in the new year, February being a good month, when roots and growths are being made.

Other Cultural Points.—A cool, moist atmosphere must be provided to ensure success, and the temperature should range from 45° at night to 65° by day, though 40° at night in severe weather will prove less injurious than a higher degree ensured by excessive firing. It will be difficult, even with damping, shading, and ventilating, to keep down the temperature in sultry summer weather. On no account must the plants be allowed to get dry at the roots, but while in summer too much water is not likely to be given, great care is necessary in applying it during the winter, for excessive water and dull weather at that season will kill many specimens.

Chimæra Group.—Coming as they do from lower levels than the other Masdevallias, Chimæra and its allies need slightly warmer conditions during the winter, and at that season are best accommodated in an intermediate house, or the cooler end of the Cattleya house. M. tovarensis is also better for similar winter treatment.

Diseases and Pests.—The dreaded "spot" which so disfigures Masdevallias is caused by excessive moisture during winter, a low temperature being often contributory. Less moisture and a few degrees more of heat will prevent the disease. Green fly is a persistent pest, and must be kept at bay by fumigation or vaporising, preferably the latter. Sponging is necessary for thrips.

Principal Species and Varieties :—

amabilis, 6″, sum., or. yel., ro. crim.
Arminii, 4″, Ap., ro. pur.
bella, 7″, spr., yel., br., crim., lip wh.
caudata, 5″, sum., yel., red., pur., wh. Shuttleworthii and xanthocorys are fine vars.
Chestertonii, 7″, spr., yellowish grn., pur., pk.
Chimæra, 9″, spr., sum., dull yel., spotted reddish pur. This is extremely variable, the finest forms being backhouseana, Gorgona, leroyana, sanderiana, senilis, and Wallisii.
coccinea, 8″, spr., ro., sc., crim. A variable species, including the harryana group. Garden forms are atropurpurea, denisoniana, grandiflora, harryana, lilacina, Lindeni, rosacea, sanguinea, and walkeriana.
Davisii, 8″, Aug., yel., or.
Denisoni (*see* coccinea denisoniana).
Ephippium, 8″, sum., red br., yel.
Estradæ, 4″, sum., yel., vio. pur.
ignea, 7″, spikes rising to 18″, spr., red, or., pur. The finest vars. are aurantiaca, Boddaertii, and massangeana.
macrura, 12″, win., yel., spotted blk.
polysticta, 6″, spr., wh., pur., yel.
racemosa, 6″, spikes 15″, sum., or. red, crim.
radiosa, 8″, sum., dark yel., spotted pur. br.
rosea, 6″, sum., red, or., rosy car.
schröderiana, 7″, Ap., ro. pur., wh., yel., rare.
tovarensis, 6″, win., wh.
triangularis, 6″, win., light yel., spotted pur.
veitchiana, 12″, spr., vermilion, flushed pur. Grandiflora is a fine var.

Principal Hybrids :—

caudato-Estradæ, pur., yel. (caudata Shuttleworthii × Estradæ).
Chelsoni, or. red (amabilis × veitchiana).
courtauldiana, ro. red (rosea × caudata Shuttleworthii).
gairiana, yel., crim. (veitchiana × Davisii).
geleniana, yel., or. (caudata Shuttleworthii × xanthina).
Heathii, or. (veitchiana × ignea superba).
hincksiana, pale yel., or., wh. (tovarensis × ignea).
Imogen, yel., crim., sc. (Schlimii × veitchiana).
kimballiana, yel., flushed vio. (veitchiana × caudata Shuttleworthii).
Pourbaixii is a good var.
McVittiæ, ro. mauve (tovarensis × veitchiana).
measuresiana, wh., flushed lil. (tovarensis × amabilis).
mundyana, or., crim. (ignea aurantiaca × veitchiana).
parlatoreana, or., flushed pur. (barlæana × veitchiana).
shuttryana, salmon yel. (caudata Shuttleworthii × coccinea harryana) (*see p.* 57).

Other Species, Varieties, and Hybrids :—

acrochordonia, 6″, spr., br., yel.
astuta (*see* erythrochæte).
attenuata, 4″, win., wh., yel.
backhouseana (*see* Chimæra var.).
barlæana, 5″, spr., or. yel., sc., crim.
Bocking Hybrid (cucullata × veitchiana).
calura, 4″, spr., reddish or.
Carderi, 5″, sum., wh., pur. br.
coriacea, 6″, spr., wh., yel., pur.
cucullata, 10″, spr., maroon pur.
demissa, 7″, sum., br. yel.
denisoniana (*see* coccinea var.).
erythrochæte, 8″, sum., wh., yel., pur. (*syn.* astuta).
floribunda, 6″, sum., yel., br., pur.
glaphyrantha (infracta × barlæana).
Gorgona (*see* Chimæra var.).
harryana (*see* coccinea var.).
houtteana, 10″, sum., wh., yel., red.
ionocharis, 5″, aut., wh., pur.
leontoglossa, 8″, spr., yel., grn., pur.
leroyana (*see* Chimæra var.).
Lindeni (*see* coccinea var.).
ludibunda, 6″, sum., pur., yel.
maculata, 6″, sum., or., br., yel.
melanopus, 6″, spr., wh., pur., yel.
mooreana, 8″, spr., yel., grn., br.
muscosa, 3″ to 6″, sum., aut., yel., grn., br.
peristeria, 6″, sum., yel., grn., pur.
reichenbachiana, 6″, sum., crim., yellowish grn.
rolfeana, 6″, sum., reddish br.
Schlimii, 12″, sum., yel., br. pur.
senilis (*see* Chimæra var.).
torta, 9″, sum., greenish yel., reddish pur.
Troglodytes, 6″, sum., wh., reddish br.
wageneriana, 3″, sum., yel., spotted red.
Wallisii (*see* Chimæra var.).
Wendlandii, 4″, sum., wh., pur., yel.
xanthina, 5″, sum., pale yel.

MASSANGEA.

Handsome stove plants (*ord.* Bromeliaceæ). Lindenii and musaica are referred to Caraguata by Mr. Baker; to Guzmannia by other botanists (*see* CARAGUATA). Hieroglyphica is included with the Tillandsias.

MASSONIA.

Bulbous plants (*ord.* Liliaceæ), more curious than pretty, and for the most part outside the scope of decorative gardening. For culture, *see* LACHENALIA.

Principal Species :—

amygdalina, wh., Almond scented. The best of all.
candida, 6″, Ap., wh.
ensifolia, 6″, Ap., lil.
pustulata, 3″, Feb. (*syn.* scabra).

Other Species :—

brachypus, 6″, wh.
jasminiflora, wh., grn. tipped, scented.

Massangea (*in part, see Caraguata and Tillandsia*).
Massovia (*see Spathiphyllum*).

MAST.

A name given to the fruit of the Beech (Beech Mast), and also to Acorns and Chestnuts.

MATONIA.

The one species of Matonia (*ord.* Filices) is one of the handsomest, rarest, and most difficult to grow among Ferns. It lingers for a while after importation, and so far no one has been successful in cultivating it.

Only Species :—

pectinata, fronds 1½′ to 2′ long, 1′ to 1½′ broad, very tough and leathery, st.

MATRICARIA.

A large genus of annual and perennial herbs (*ord.* Compositæ), most of them weeds. Inodora, once it gets a footing, seeds so freely that it is difficult to get rid of. The double form, plenissima, is cultivated to some extent, and is worth a place in the garden. There is a good deal of confusion amongst the Matricarias, several plants sold under that name really belonging to the allied genus Pyrethrum. All the plants can be raised from seeds, and the perennials can also be increased by root division. Any common garden soil will do.

Principal Species and Varieties :—

inodora, 1′ to 2′, Je., Nov., ann., wh. (British). Scentless Mayweed.
— discoidea, 9″ to 12″, wh., scented foliage.
— maritima, very fleshy lvs., seashore (British).
— plenissima, double flowers (*syn.* flore pleno).

Other Species and Varieties :—

Chamomilla, Common Chamomile, 12″ to 18″, Je., Aug., wh. (British).
Parthenium (*see* Pyrethrum Parthenium).

MATS.

For covering frames or plants upon walls during frosty weather, mats are indispensable. The well-known Archangel mats, made from the soft, tough inner bark of Tilia europæa, are in common use. They are of heavy and light qualities, but in either case need a little preparation before use. The rough pieces of bark at the edges should be pulled out, and the ends of the strands tied up, three or four together. This lengthens the life of the mat. Archangel mats are also frequently employed by nurserymen for packing plants in. Old Archangel mats may be used for shading, and for tying up Celery. Home made mats of straw are light and fairly useful, but they are open to the objection of untidiness, unless made very carefully. To make them, a light framework of wood, about 6″ bigger each way than the required mat, should be placed together. To the top of this rack a number of pairs of strings, about twice as long as the mat requires, should be attached. The number of pairs of strings will vary with the width of the mat, but they should be not more than 9″ apart. Then proceed to tie in small handfuls of straw until the requisite length is reached. Like all other protective material, they should be dry to keep out the frost.

Mastachantus sinensis (*see Caryopteris Mastachanthus*).
Mastich Tree (*see Pistacia Lentiscus*).
Mataxa (*see Lasiospermum*).
Maté (*see Ilex*).
Mathea (*see Schwenkia*).
Matrimony Vine (*see Lycium*).

MATTHIOLA (*syn.* MATHIOLA).

A rather large genus of hardy, half-hardy, or greenhouse, annual, biennial, or perennial herbs or shrubs, with showy flowers, and of easy culture. The fragrant Stocks of gardens sprang from several species of Matthiola. (For culture, *see* STOCKS.)

Principal Species and Varieties :—

bicornis, spr., hlf-hdy. sub-shr., pur., red. Night-scented Stock.
incana, 1′ to 2′, sum., aut., hlf-hdy. bien., pur. The parent of the Brompton and Queen Stocks. Wallflower-leaved Stock.
— annua, 1′ to 2′, My., Oct., hdy., flowers various (*syn.* annua). Ten-Week Stock.
— flore pleno, like type, flowers double, more compact growth.

Other Species :—

annua (*see* incana var.).
fenestralis, 1′, Jy., Aug., hdy. bien, sc. or pur.
odoratissima, 1′ to 2′, Je., Jy., grh. sub-shr., yel., scented in the evening.
tricuspidata, 1′, sum., hdy. ann., bl.

MATTOCK.

A variant of the pickaxe, differing only from that implement in having one arm pointed. The second is flattened to a rough cutting edge, running transversely to the handle. The mattock is thus a compromise between a grubbing axe, which has both arms terminated in a cutting edge, and a pickaxe. It is useful for breaking up old gravel paths, cutting trenches round trees that are being root pruned, and also for root grubbing generally. It is not infrequently dubbed a "grubbing" or "grub axe" in rural districts.

MAURANDIA (*syn.* MAURANDYA).

Climbing herbs with showy flowers (*ord.* Scrophularineæ). Barclayana, the species most frequently met with, is a beautiful plant for covering a wall or a trellis, for it is of graceful habit, flowers freely, and will grow in any fairly light, rich soil. It does best if treated as an annual. Erubescens, and scandens, which some botanists consider to be a variety of semperflorens, also do well upon a trellis or south wall. Seeds may be sown at the beginning of March, in brisk heat, the seedlings being potted on and subsequently hardened off for planting out at the end of May. Cuttings of young growths may be rooted under a bell-glass, in sandy soil, in August. They like a sandy loam.

Principal Species :—

barclayana, sum., hlf-hdy. ann. or per., vio., pur.
— luceyana, pk.
erubescens, sum., aut., hlf-hdy., ro., wh. (*syn.* Lophospermum erubescens of the *Botanical Register* 1381).
scandens, sum., hlf-hdy., pur., vio. (*syns.* Lophospermum and Usteria scandens).

Other Species :—

antirrhiniflora, Jy., pur., wh. (correctly Antirrhinum maurandioides).
atrosanguinea (*see* Rhodochiton volubile).
Hendersoni, vio., pur., striped wh.; probably a var. of scandens.
luceyana (*see* barclayana var.).
semperflorens, sum., vio., or., red.

MAURIA.

An obscure genus of stove evergreen trees (*ord.* Anacardiaceæ), all from tropical America. Two

Matthisonia (*see Schwenkia*).
Mattuschkia (*see Saururus*).
Maudlin, Sweet (*see Achillea Ageratum*).
Mauhlia (*see Agapanthus*).

species, heterophylla and simplicifolia, have been introduced, but they are probably long since lost to cultivation.

MAURITIA.

The six or seven species making up this genus (*ord.* Palmæ) are handsome stove Palms, with fan-shaped leaves. They are, however, rare in cultivation. Seeds should be sown in a brisk hotbed, in spring, otherwise germination is slow. A compost of peat and loam, in equal parts, with sand, is suitable, and the plants should be stood during the hot days of the summer a few inches deep in a tank of warm water, for they are thirsty subjects.

Principal Species :—

aculeata, stem prickly and lvs. bearing spiny hairs.
flexuosa, stem unarmed.

MAXILLARIA.

Description.—A large genus (*ord.* Orchidaceæ) of terrestrial Orchids, distributed throughout central America from Brazil to the West Indies. The species display a considerable range of variation, but the flowers are in most cases thick and fleshy. Comparatively few species are in cultivation, due to the fact that the blooms are, for the most part, less showy than those of many other Orchids.

Propagation. — By imported pieces, and by division of the pseudo-bulbs. Spring is the best season to carry out division, and the pieces should be started in a rather close and warm pit.

Soil.—Peat and chopped sphagnum, with a little sand. A few points of live sphagnum should be employed for surfacing.

Other Cultural Points. — Although they come from tropical regions it will be noted, from the lists given below, that most of the Maxillarias can be grown in a cool house, and with the Lycastes, if desired. When they are making growth they will appreciate a shift into an intermediate house, but they should be kept out of the warmest houses, or growth will be rapid and correspondingly weak.

Most of the plants do best in pots, which should be well drained, as a constant supply of water is needed all the year round. To attempt to dry them off would be fatal, although less water is needed in winter. A number of species, amongst which may be mentioned meleagris and tenuifolia, have creeping rhizomes, and these may be accommodated upon blocks of wood or Tree Fern. Shade during bright weather is essential, and as this shade should be rather heavier than that given to most Orchids, it will be well to place the Maxillarias in a corner by themselves.

MAXILLARIA SCURRILIS (*see p.* 61).

Maurocenia (*see Cassine*).

Principal Species and Varieties :—

acutipetala, 9″ to 12″, spr., cool house, or., yel., lip red spotted.
callichroma, 8″ to 12″, sum., cool house, wh., br., pur., yel.; allied to luteo-alba.
fucata, 1′ to 1½′, sum., cool house, sepals ochre yel. with red spots, petals wh., yel., lip red, yel. (*syn.* fuscata, a misprint).
grandiflora, 1′ to 1½′, spr., cool house, wh., lip three - lobed, striped crim. yel., scape one-flowered (*syn.* eburnea).
houtteana, 6″, spr., br., yel.
Lehmanni, wh., side lobes of lip reddish br.
Lindeniæ, 1′ to 1½′, win., cool house, wh., petals lined ro. pk., fragrant, lvs. very broad.
luteo-alba, 1½′ to 1½′, cool house, flowers at various seasons, wh., yel., lip streaked pur., fragrant (*syn.* luteo-grandiflora).
ochroleuca, 9″ to 12″, win., cool house, wh., lip yel., fragrant.
— longipes, larger, better habit.
picta, 12″ to 16″, win., spr., cool house, pale yel., barred red, fragrant.
sanderiana, 8″ to 15″, spr., cool house, wh., marked blood red, very large (4″ to 6″ across) and fleshy; the best species. Fuerstenbergiana and xanthoglossa are the best vars.
sanguinea, win., spr., intermediate house, red, br., yel.; close to tenuifolia.
tenuifolia, 8″ to 12″, spr., cool house, dark red, lip blood red, yel.
trifloris, close to luteo-alba, but with a pale pur. flush.
Turneri, 1′, My., br., crim., sweet.
venusta, 1′ to 1½′, win., spr., cool house, wh., yel., very large and showy (*syn.* Anatomorum).

Other Species and Varieties :—

angustifolia (*see* variabilis).
arachnites, spr., cool house, yel., lip bordered pur.
aureo-fulva (now Bifrenaria aureo-fulva).
bractescens (now Xylobium bractescens).
crassifolia, 1′ to 1½′, cool house, yel., small.
crocea, 6″ to 9″, sum., cool house, or., yel., lip red br.
cucullata, 1′, aut., cool house, grn., br., chocolate.
densa (now Ornithidium densum).
dichroma, 1′ to 1½′, win., cool house, wh., lip red spotted.
eburnea (*see* grandiflora).
Harrisoniæ (*see* Bifrenaria Harrisoniæ).
Huebschii, sum., cool house, wh., margined mauve pur.; habit like that of fucata.
hyacinthina (now Xylobium hyacinthinum).
hyprocrita (now Xylobium hypocritum).
leontoglossa (now Xylobium leontoglossum).
lepidota, 9″ to 15″, aut., cool house, yel., lip spotted pur.
leptosepala (*see* setigera).
longisepala, 6″ to 10″, sum., cool house, pur., br., lip yel., grn., spotted br.
macrophylla (*see* Lycaste macrophylla).
marginata, 9″, aut., cool house, or., yel.
meleagris, like tenuifolia, flowers yel., spotted red.
nigrescens, 1′ to 1½′, win., spr., cool house, dark port wine colour.
pallidiflora (now Xylobium pallidiflorum).
palmifolia (now Xylobium decolor).
Parkeri, 1′ to 1½′, spr., intermediate house, yel., wh.
parva, dwarf, yel.
porphyrostele, close to picta but dwarfer, yel., striped pur.
punctata, 8″ to 12″, flowers at various seasons, cool house, yel., red spotted.
pungens (*see* Bifrenaria Harrisoniæ).
rufescens, 8″ to 10″, win., spr., cool house, yel., reddish br.
scabrilinguis (now Xylobium scabrilingue).
scurrilis, 1′, Jy., yel., wh., spotted pur. (*see p.* 60).
setigera, 8″ to 12″, spr., cool house, wh., yel. (*syn.* leptosepala).
— pallida, a pale var.
squalens (now Xylobium squalens).
Steelii (now Scuticaria Steelii).
striata, habit like venusta, aut., cool house, yel., striped red chocolate.
— grandiflora, large and fine.
— lutea, yel.
variabilis, habit like tenuifolia, spr., cool house, flowers pur., red or yel., about 1″ across (*syns.* angustifolia and Henchmannii of *Botanical Magazine* 3614).
Wageneri (now Xylobium corrugatum).
warreana (now Warrea tricolor).
xanthina (now Zygopetalum xanthinum).

MAXIMILIANA.

Three species of elegant stove Palms (*ord.* Palmæ). They are closely allied to the genus Cocos, and may be treated in the same way as C. weddelliana, except that, being of considerable height and spread, they need stout wooden tubs to accommodate the roots, and plenty of head room. They are, in fact, only suitable for large houses.

Principal Species :—

caribæa, like martiana, but with wide pinnæ.
martiana, lvs. pinnate, pinnæ 2′ long, unarmed, trunk slender, round, and smooth (*syn.* regia).

Other Species :—

Jagua, not in general cultivation.
regia (*see* martiana).

MAY BUGS.

The larvæ of several beetles which prey upon the foliage of Oaks, Roses, and fruit trees. They include the Cockchafer (Melolontha vulgaris) and the Lesser May Bug (Phyllopertha horticola). Methods of combating the pests have been already referred to under Cockchafers, which *see*. The Lesser May Bug occasionally attacks pot plants, the larvæ feeding upon the roots. Where their presence is suspected the plants should be knocked out of their pots and the soil carefully examined. Watering with clear lime water is sometimes helpful.

MAYTENUS.

A rather large genus (*ord.* Celastrineæ) of greenhouse or half-hardy evergreen shrubs and small trees. Several of the trees are of value on account of the great hardness and durability of their wood. The leaves of some of the Peruvian species are eaten by cattle. Propagation, by cuttings of the ripened shoots under a hand-glass, and by layers in autumn. Soil, loam and sandy peat in equal parts.

Principal Species :—

Boaria, 10′, grh. shr., wh.

MAZE.

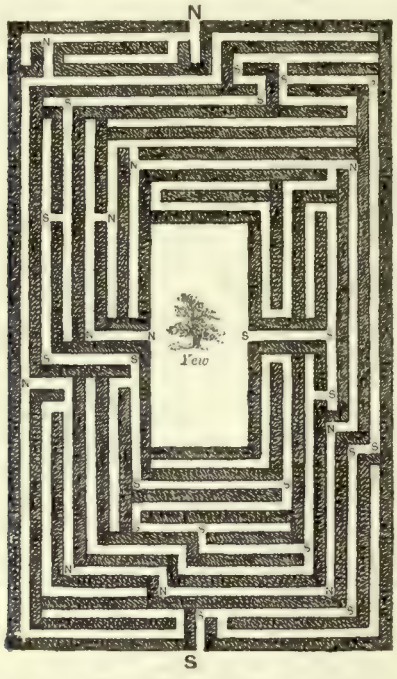
A section of the garden intended more for amusement than for beauty of ornamentation. Formerly a maze or labyrinth was included in every garden of note, but now it is restricted to very few. The most noteworthy one is that in Hampton Court Gardens. The paths should all lead to the centre by various twists and turnings, and on the return journey the difficulties should appear more plentiful. For hedges to border the paths, Yew, Privet, Firethorn, Whitethorn, etc.,

Maximiliana (*of Martius, see Cochlospermum*).
Maximowiczia (*see Schizandra*).
May (*see Cratægus*).
May Apple (*see Podophyllum peltatum*).
May Bush, Californian (*see Photinia arbutifolia*).
May Flower (*see Epigæa repens and Lælia majalis*).
Maypole, West Indian (*see Spathelia simplex*).
Mays (*see Maize and Zea*).

may be used, but in the case of public grounds it is not advisable to open a maze until the hedges are 3′ to 4′ high and proportionately wide. Mazes may be of various shapes and sizes, or they may follow the natural contour of the ground. It is necessary to have some indication of the way out, or to have an attendant in the neighbourhood.

MEALY BUG.

A well-known and troublesome insect (Coccus Adonidum) infesting stove and greenhouse plants. It belongs to the *ord.* Homoptera, and is closely related to Scale. In the Scale insects the female



The Hatfield Maze.

soon loses her power of movement; the female Mealy Bug is able to move throughout the whole period of her life. She secretes a viscous fluid which ultimately becomes a covering of white, cotton-like substance, with which she covers herself and her eggs and young. The female is wingless. Both are really red, but covered with the white substance referred to, which disguises their true colour.

The insects do harm to the plants by sucking the sap and also by choking up the pores of the leaves with their excreta.

Many remedies have been recommended. One of the best of the home-made ones is paraffin emulsion (*see* Insecticides). Good proprietary compounds are Fir-tree Oil, Lemon Oil, and Swift and Sure, applied at the strength recommended by the makers. Tobacco water applied with a sponge is helpful, and Gishurst Compound is serviceable in the case of Vines and Figs; it is not so suitable for soft-wooded plants. A teaspoonful of petroleum in a gill of warm soft water, if kept constantly stirred, may be applied with a soft brush: the bug colonies melt away before it, but the stirring must be constant. Fumigation with Tobacco Rag and Paper is only partially successful. The constant cleansing of the plants with one of the washes suggested is the only trustworthy method of ridding the plants of bug, and in the case of Asparagus and Cyperuses not even that avails; the dirty tops of the plants must be cut off and burnt.

For Vines and Figs, as well as for all greenhouse and stove hard-wooded climbers, it is imperatively necessary that a thorough cleansing should be given during the winter months, or after pruning.

Further hints will be found under the headings of the plants most affected.

Mazeutoxeron (*see Correa*).
Meadow Beauty (*see Rhexia virginica*).
Meadow Grass (*see Poa*).
Meadow Pink (*see Dianthus deltoides*).
Meadow Rue (*see Thalictrum*).
Meadow Saffron (*see Colchicum*).
Meadow Saxifrage (*see Saxifraga granulata*).
Meadow Sweet (*see Spiræa Ulmaria*).
Mealies (*see Maize and Zea Mays*).

MEASURES.

Fruit and Vegetables.—For retail sales, vegetables like Potatoes and Artichokes, and almost all fruits, are disposed of in London by the pound. In the country the half-gallon, gallon, peck, and bushel are in common use. Covent Garden Market has a series of measures almost peculiarly its own, and these are frequently quoted in the market lists in gardening and other papers. A few of the most important of these measures are given.

Sieve.—The diameter is usually 15″, the depth 8″, and the contents are 7 imperial gallons. A sieve of Peas is about a bushel, one of Currants is 20 quarts. Commonly used for hard fruit.

Half-Sieve.—Diameter 12½″, depth 6″, contents 3½ gallons. Used for fruits (hard chiefly).

Bushel Basket (*Flat*).—Such a basket when "heaped" holds an imperial bushel. Diameter at bottom 10″, at top 14½″; depth, 17″. Nuts, Apples, and Potatoes are still sold by this. A bushel of Potatoes should weigh ½ cwt.

Junk.—Two-thirds of a bushel, a measure now rarely used.

Strike.—A peck basket; used for soft fruits and Tomatoes.

Barrel (*American*).—About 3 bushels. Used for Apples.

Pottle.—A long, narrow basket, holding about 1½ pints. A pottle of Potatoes weighs about 3½ lbs., less or more, according to the variety. A pottle of Mushrooms is 1 lb.

Punnet.—A basket, usually rather flimsy, used to hold Strawberries, Saladings, Mushrooms, Seakale, etc. Seakale punnets are 8″ across at the top, 7½″ at the bottom, and 2″ deep. For Radishes they are of various sizes according to the number of "hands" they are intended to hold. Salading punnets are 5″ across by 2″ deep, and Mushroom punnets 7″ across by 1″ deep.

Hand.—Used for Radishes. A "hand" of Radishes usually contains from 12 to 30, but varies according to the season.

Bunch.—Used for herbs, Carrots, Turnips, etc., the size varying according to the season. A bunch of Turnips may be any number from 20 to 25, of Carrots 36 to 40.

Bundle. — Used for Broccoli, Celery, Rhubarb, and Asparagus. A bundle of Broccoli or Celery has from 6 to 20 heads; Rhubarb, 20 to 30 stems; Seakale, 12 to 18 heads; and Asparagus from 100 to 125 heads.

Handle Baskets (*French*) are employed for Grapes, Tomatoes, and Mushrooms. Grapes are also put up in 2 lb. and 4 lb. punnets, and young Potatoes in 2 lb. punnets.

Tally.—Between 50 and 60 heads.

Pound weights are 16 oz.

For Plants.—In describing the height of a plant feet (′) and inches (″) are usually sufficient, but where great accuracy is employed the Line is brought in. Twelve lines go to an inch. The metric system is occasionally used. Approximately 25 mm. go to an inch. To obtain the number of inches in any number of millimetres, multiply the latter by 10 and divide by 254.

Land Measures. — Gunter's Chain is usually employed. It has 100 links, each 7·92″ long, and its total length is 66′.

Measuring rods are sometimes handy in the garden. They should be marked off in feet and inches; 3′, 6′, 10′, and 12′ are handy lengths, but they are not indispensable.

MECONOPSIS.

Hardy annual, biennial, or perennial herbs (*ord.* Papaveraceæ) with large, showy flowers. They are of easy cultivation in any fairly good garden soil, although they prefer one light and rich, together with a sunny position. Propagation is by seeds, which should be sown early in March under glass for the tender forms, and out of doors in early April for the hardy ones. Heterophylla is a pretty annual that takes kindly to pots as well as to outdoor culture. Although the Meconopsises can stand a greater degree of heat and drought than many other plants, occasional supplies of manure water during the height of their growth will be appreciated.

Principal Species and Varieties :—

cambrica, 1′, My., Aug., hdy. per., pale yel. Welsh Poppy.
— flore-pleno, double flowers.
heterophylla, 1′, sum., hlf-hdy. ann., copper, or., dark crim. centre.
nepalensis, 3′ to 5′, sum., bien., pale yel.
Wallichii, 4′ to 6′, Je., per., pale bl.
— fusco-purpurea, br.-pur., otherwise like type.

Other Species :—

aculeata, 2′, sum., bien., pur. (*see* figure).
quintuplinervia, sum., hdy. per., pale vio.
simplicifolia, 3′, Je., bien., vio. pur.

MEDEOLA (*syn.* GYROMIA).

The one species left in this genus (*ord.* Liliaceæ) is a hardy herbaceous plant, with a white, fleshy rhizome tasting something like a Cucumber. It may be increased by root division in spring, and likes a light, rich soil, although it is of no horticultural value. The genus Medeola owes most of its notoriety to the fact that at one time it contained the popular Smilax. (*See* ASPARAGUS MEDEOLOIDES.)

Only Species :—

virginica, 9″, hdy., Je., yel. or greenish yel.

Media (*see Dodecatheon*).
Median Apple (*see Citrus medica*).
Medica (*see Tourretia*).

MEDICAGO.

A large genus (*ord.* Leguminosæ), but horticulturally not an important one. Sativa is only of value as a fodder plant. Falcata is worth cultivating in the garden, for it does well in any ordinary soil upon banks, slopes, and in rough rockwork. Echinus is grown as the Calvary Clover, so called from the large purple black blotches upon the leaves. Propagation is by seed sown at any time during spring. The seeds of Echinus should be sown in shallow, well-drained pans in a cold frame early in April, and the seedlings afterwards pricked off, 1″ apart, into 5″ pots, and grown on in the conservatory. The curled and spiny fruits are curious.

Principal Species :—

arborea, 2′ to 8′, My., Nov., yel., stem woody.
Echinus, 6″, Jy., hdy. ann., yel.
falcata, 2′ to 4′, sum., hdy. herbaceous per., pale yel., stems prostrate.
sativa, 2′, sum., hdy. per., vio.; versiolor is a var. Purple Medick or Lucerne.

Other Species :—

marina, 1′, Je., Aug., hdy., yel.
scutellata, sum., hdy. ann., yel.

Photo: W. H. Wade.

MECONOPSIS ACULEATA.

MEDICOSMA.

There is only one species, Cunninghamii, in this genus (*ord.* Rutaceæ). Botanically, Medicosma Cunninghamii is the correct name of the plant dealt with as ACRONYCHIA CUNNINGHAMII.

Medick (*see Medicago*).

MEDINILLA.

Description.—Of the many species in this genus of stove shrubs (*ord.* Melastomaceæ) only two, Teysmannii (amabilis) and magnifica, are much grown. Medinillas are distinct from most other stove plants by their curiously winged stems, large, leathery leaves, and huge, pendent bunches of bright flowers. They are of remarkably easy culture, provided the soil is not allowed to become sour and water-logged.

Propagation.—By cuttings, which are rather difficult to root. They should be taken off in spring, with a heel of the old wood, and inserted in very sandy soil in brisk bottom heat.

Soil.—Fibrous loam, peat, and leaf mould, with sand, form a good compost.

Other Cultural Points.—In proportion to their size rather small pots will do for Medinillas; many suffer from overpotting. Once in three years is often enough to disturb established specimens, although a top-dressing may be given annually. The soil should be fairly firm. Plenty of light, a high temperature, and a moist atmosphere are requisite. Soot water is a capital stimulant. Mealy bug is the worst insect pest, but occasionally thrips are troublesome.

Principal Species and Variety :—

Curtisii, shr., wh., pur. anthers and coral red flower-stems.
magnifica, 3′ to 4′, My., ro. pk., in large pendent racemes.
— rubra, darker flowers.
Teysmannii, spr., ro. pk. (*syn.* amabilis).

Other Species :—

javanensis, 4′, win., shr., flesh pk.
sieboldiana, 4′, win., shr., wh., stamens pur.
speciosa, 2′ to 3′, Jy., crim.

MEDLAR.

Mespilus germanica (*ord.* Rosaceæ) from which the Medlars have arisen, is a hardy, dwarf tree or shrub with flowers of some beauty. Its growth is, however, usually gnarled and twisted, and this peculiarity is shared by the cultivated varieties. After reaching maturity, the trees flower and fruit pretty regularly, but the fruit is not in great request. When fit to gather it is hard, and is stored until decay has become advanced. This softening of the flesh (bletting) takes from two to four weeks, and the fruits remain eatable for a few weeks longer. Budding and grafting are the methods of propagation chiefly practised. The Pear, Quince, and Whitethorn, as well as the seedling Medlar, are used for stocks. Cleft grafting in April, and shield budding, with dormant buds, in July, are the methods favoured. The stock will require close attention to disbudding after the union is complete. Any loamy soil will do, and little pruning is required beyond cutting out dead wood. The fruit should be gathered about the end of October, when it may be consigned to a cool cellar or fruit room.

The flavour of a bletted Medlar is peculiar, and the fruit is not likely ever to become popular. Still, as a park and shrubbery tree the Medlar is planted, and in most cases the fruit is really a secondary object.

There are several sorts, but three only are worthy of mention :—

Dutch. Fruit large; eye very wide open. The most common var. (*syns.* Broad-leaved Dutch and Large Dutch).
Nottingham. Fruit much smaller than in the Dutch, but more acid. The best flavoured var. of all.
Stoneless. Fruit small, poor in flavour, but with long keeping qualities.

(For species, *see* MESPILUS.)

MEDLAR CLUSTER CUPS.

The red and orange pustules seen upon the leaves of the Medlar and the Hawthorn are the work of the fungus Gymnosporangium confusum. The best method of dealing with the pest is to closely watch the Junipers for infection, as one stage of the fungus lives on these, and either excise the branches attacked or uproot and burn the trees. Spraying with potassium sulphide (*see* INSECTICIDES) helpful.

MEGACARPÆA.

Coarse-growing herbs (*ord.* Cruciferæ) with thick, fleshy roots, white or violet flowers, and glaucous leaves. They are of little value, but may be increased by seeds, and flourish in light, sandy soil.

Principal Species :—

laciniata, 6″ to 12″, Je., Jy., hdy. per., yel.

MEGACARYON.

A coarse-looking herb (*ord.* Borragineæ), either biennial or perennial. Propagation, by seeds sown in spring or when ripe. Ordinary garden soil.

Only Species :—

orientale, 3′ to 4′, sum., hdy., ro. lil. (*syn.* Echium orientale).

MEGACLINIUM.

Stove epiphytal Orchids (*ord.* Orchidaceæ), characterised by a curiously flattened flower scape. They are closely related to the Bulbophyllums, and answer to the same cultural treatment. The majority are curiosities. The pseudo-bulbs and leaves are only a few inches in height.

Principal Species :—

Bufo, spr., st., br., lip pur.
Clarkei, spr., st., pur., br.
falcatum, spr., st., br., red, grn.
minutum, spr., st., maroon, yel.
purpuratum, spr., st., yel., spotted pur.
scaberulum, sum., warm grh., pur., grn.

Other Species :—

imschootianum, st., yel., grn., spotted br.
leucorhachis, st., yel.
maximum, Je., Jy., st., yel., spotted red.
nummularia, st., close to minutum.
oxyodon, st., like falcatum (*syn.* Bulbophyllum oxyodon).
pusillum, st., grn., pur.
triste, st., grn., spotted blk.

MEIRACYLIUM.

The principal species, Gemmæ (*syn.* Sophronitis), of this genus (*ord.* Orchidaceæ) has erect, fleshy leaves and bright amethyst-hued flowers, produced in spring. It succeeds under the same treatment as that accorded to Sophronitis, and may be grown with it.

Medlar, British (*see Mespilus*).
Medlar, Japanese (*see Photinia japonica*).
Medusa's Head (*see Euphorbia Caput-Medusæ*).
Megacarpha (*see Oxyanthus*).
Megasea (*see Saxifraga*).
Meisteria (*see Enkianthus*).

MELALEUCA.

There are about 100 species in this genus (*ord.* Myrtaceæ), chiefly greenhouse evergreen trees or shrubs. Propagation is by short cuttings of semi-matured shoots under a bell-glass in May. Peat and sandy loam, in equal parts, make an excellent compost. The recommendations of the genus are economic rather than decorative. The bark of Leucadendron, the Cajeputi or Cajuput Tree, is used by the Australian aborigines for making tinder, and from the variety minor is obtained the volatile Cajuput Oil, used internally as a stimulant, and externally as a liniment.

Principal Species and Variety :–

Leucadendron, 15′ to 20′, st., wh. in spikes.
— minor, dwarfer.

Other Species :—

armillaris, 6′ to 8′, Je., shr., wh.
coronata (*see* thymifolia).
decussata, 20′, Aug., shr., lil.
diosmifolia, 3′ to 10′, Je., shr., grn., yel.
Fraseri (*see* striata).
fulgens, 6′ to 20′, Jy., Sep., shr., sc.
genistifolia, 30′ to 40′, Je., red.
hypericifolia, 10′ to 20′, Jy., Aug., sc.
incana, 3′, Jy., yel., wh.
pulchella, 2′ to 3′, Je., Sep., shr., red.
squamea, 4′, Je., shr., reddish pur., wh., or yel.
squarrosa, 6′ to 10′, Je., Aug., shr., yel., wh.
striata, 4′, Je., shr., pk. (*syn.* Fraseri of *Botanical Magazine* 3210).
styphelioides, 4′ to 20′, My., Jy., shr., wh.
thymifolia, 2′, Je., Sep., shr.,pur.(*syn.*coronata).
Wilsoni, shr., red.

MELAMPODIUM.

An obscure genus of stove, greenhouse, or hardy herbs and sub-shrubs (*ord.* Compositæ), chiefly from the warmer parts of America. Paludosum (*syns.* divaricatum and ovalifolium) and perfoliatum have been introduced, but neither is of any garden value.

MELAMPYRUM. (Cow Wheat.)

Hardy annual herbs (*ord.* Scrophularineæ) with brightly coloured flowers. All are more or less parasitic on roots of neighbouring plants, and seeds may be sown in spring amongst short Grass.

Principal Species :—

arvense, 1′ to 2′, Jy., Aug. ro., yel. Britain. Purple Cow Wheat.
cristatum, 6″ to 18″, Sep., Oct., yel., tipped pur. Britain.
pratense, 6″ to 18″, My., Aug., yel. Britain. Yellow Cow Wheat.

MELANORRHŒA. (Black Varnish Tree.)

Tall-growing stove evergreen trees (*ord.* Anacardiaceæ), propagated by cuttings of the ripe shoots in a close frame, in sand, in a brisk bottom heat. Soil, sandy peat and loam in equal parts. Usita yields the black varnish of commerce. The tree is tapped, and the thick white juice thus obtained is subsequently exposed to the air until it turns black. It must be kept under water to preserve it in condition.

Principal Species :—

usita, 100′, st., red (*syn.* usitatissima).

Melanchrysum (*see Gazania*).
Melanocarpum Sprucei (*see Pleuropetalum costaricense*).
Melanoselinum (*see Thapsia*).

MELANTHERA.

Herbs and sub-shrubs (*ord.* Compositæ) of little garden value and rarely grown. They may be propagated by seeds and root division in spring. Ordinary soil.

Principal Species :—

deltoidea, 3′, Jy., Aug., st., yel. (*syn.* Calea aspera).
hastata, 3′ to 6′, Je., Jy., hlf-hdy., wh.
— pandurata, lvs. fiddle shaped.

MELANTHIUM (*syn.* Leimanthium).

A small genus of hardy bulbs (*ord.* Liliaceæ) from North America. They are not much grown,

Melianthus major (*see p.* 66)

and are of little worth. Propagation, by seeds and offsets. Ordinary soil.

Principal Species :—

virginicum, 3″ to 5″, Jy., cream, yel., br. (*syn.* Helonias virginica of *Botanical Magazine* 985). Bunch Flower.

MELASMA (*syns.* Gastromeria, Lyncea, and Nigrina).

Roughly hairy herbs (*ord.* Scrophularineæ) needing a stove or greenhouse temperature, but rarely, if ever, cultivated, and of no value.

MELASPHÆRULA (*syns.* Anglæa and Diasia).

The one species in this genus (*ord.* Irideæ) is a pretty greenhouse bulbous subject, very free flowering, and easy to grow. It may be placed with the Ixias, and treated like them.

Melarhiza (*see Wyethia*).
Melaspinæa (*see Ægiceras*).

Only Species :—

graminea, grh., Ap., wh., striped pur., lvs: Grass-like (*syns.* parviflora and Gladiolus gramineus).

MELASTOMA.

Stove evergreen shrubs (*ord.* Melastomaceæ), chiefly of botanical interest. Few of the species are in cultivation. Cuttings may be rooted in sandy peat, in bottom heat, in spring. Soil, equal parts of loam and peat, with sand.

Principal Species :—

candidum, 4½′, sum., pk.
sanguineum, 4′ to 6′, Sep., Oct., pur. (*syn.* decemfidum).

Other Species :—

corymbosum, sum., pur. (now Amphiblemma cymosum).
decemfidum (*see* sanguineum).

MELHANIA.

Stove and greenhouse shrubs and sub-shrubs (*ord.* Sterculiaceæ), of no value, and probably not in cultivation. Propagation, by cuttings.

Principal Species :—

Erythroxylon, 15′, Je., st., wh., changing to pk.; wood hard and red (*syn.* Trochetia Erythroxylon).
Melanoxylon, 20′, st., wh.; flower Malva-like.

MELIA. (Bead Tree.)

Stove, greenhouse, or half-hardy trees (*ord.* Meliaceæ), with white or purple flowers in large panicles. Propagation, by cuttings of firm shoots in sand under a bell-glass in bottom heat. A sandy loam suits. While Melias have comparatively little decorative value, with the exception of Azedarach and its varieties, and japonica, they are interesting because in Catholic countries the nuts are threaded for "beads" on rosaries. Hence the name "Arbor Sancta," which is sometimes used. The nuts have a natural hole through the middle that renders the threading easy.

Principal Species and Varieties :—

Azedarach, 40′, sum., hdy. in South of England, lil., lvs. fragrant, ornamental (*syn.* sempervirens).
— floribunda, a floriferous var., blooms whilst very small.
— umbraculiformis, of umbrella-like habit.
japonica, 20′ to 40′, sum., hlf-hdy., lil., fragrant. According to *Index Kewensis*, this is a var. of Azedarach).

Other Species :—

Azadirachta, 20′, sum., st., bl.
composita (*see* dubia).
dubia, 30′, sum., st., wh. or pk. (*syn.* composita).
sempervirens (*see* Azedarach).

MELIANTHUS. (Honey Flower.)

A small genus (*ord.* Sapindaceæ) of greenhouse or half-hardy herbs, usually strongly scented. Of the four species, major is the only one that is well known. It is frequently employed in sub-tropical gardening, and its glaucous leaves are quite distinct in hue from those of any other plant, save, perhaps, the Eucalyptus. It also does well in the conservatory. Propagation, by cuttings, which root freely in a close frame, or by seeds. While not truly hardy, except in very favoured spots in the south of England, it will stand the winter out of doors in all but very bleak spots if its roots are protected with a few inches of dry litter. A light, rich soil gives the best results.

Principal Species :—

major, 4′ to 20′, hlf-hdy., lvs. glaucous, flowers br., bushy, stems hollow. Honey Flower (*see p.*65).

Other Species :—

comosus, 3′ to 5′, aut., grh., or. yel. (*syn.* minor of *Botanical Magazine* 301).
minor, 5′, Aug., grh., dark br.
pectinatus, 6′ to 10′, win., grh., sc. (*syn.* trimenianus).

MELICHRUS.

Two species of ornamental greenhouse shrubs (*ord.* Epacrideæ) from Eastern Australia. They may be increased by 2″ cuttings, taken from the side shoots and rooted in sandy soil. Pot firmly in sandy peat, with a few pieces of charcoal.

Only Species :—

medius (*see* urceolatus).
rotatus, Je., sc., a procumbent shr.
urceolatus, 2′, Ap., sc., an erect shr. (*syn.* medius).

MELICOCCA.

A few species of stove trees (*ord.* Sapindaceæ) with edible berries of pleasant flavour. Ripened shoots may be rooted in sand, under a bell-glass, with bottom heat. Soil, loam and sandy peat in equal parts.

Principal Species :—

bijuga, 40′ to 50′, st., yel.; berry as large as a Bullace, blk., very sweet. Honey Berry, Genip Tree.

MELILOTUS. (Melilot.)

A rather large genus (*ord.* Leguminosæ) of hardy herbaceous plants, with yellow or white flowers, to which bees are partial. Propagation is by seeds and root divisions. Any ordinary soil. They are not of any special decorative value.

MELISSA.

Three or four species of hardy perennial herbs or sub-shrubs (*ord.* Labiatæ) possessed of a strong essential oil. They have white or yellow flowers, and are of easy culture in any fairly good garden soil. The most important member of the genus is officinalis, which has already been dealt with under Balm.

Principal Species and Variety :—

officinalis, 2′ to 4′, Je., Oct., hdy., wh. or pale yel. Britain. Common Balm.
— variegata, a variegated form occasionally used as an edging to flower beds.

MELITTIS. (Bastard Balm.)

A handsome hardy perennial (*ord.* Labiatæ), indigenous to Britain. It may be increased by root division after flowering is over. Any ordinary garden soil will do, and the plant will thrive almost anywhere. It makes a capital subject for the margins of shrubberies, and is well deserving of a place in the herbaceous border.

Only Species :—

Melissophyllum, 1′ to 1½′, My., creamy wh., spotted pk. Var. grandiflora has cream flowers with a pur. red lip. (Melissophyllum of Thunberg is Rehmannia chinensis.)

Melidora (*in part, see Enkianthus*).
Melilot (*see Melilotus*).
Melinospermum (*see Dichilus*).
Melinum (*see Zizania*).
Melloca (*see Ullucus*).

MELOCACTUS. (Melon Thistle.)

Description.—Curious succulents (*ord.* Cacteæ) with globular, unbranched stems, regularly ribbed from bottom to top. At the point where these ridges meet is a cylindrical process known as the "cap." The ridges and cap are spiny, and the name "Melon Thistle" suggests at once this globular shape and spiny character. Few species are in cultivation. Communis is the commonest, and even this is often rather difficult to grow. All are found naturally in very dry, rocky, or sandy tracts, and under cultivation they must have a high temperature, a comparatively small quantity of soil of a very porous nature, little water, and free drainage. Damp, foggy winters are inimical to their health, and even with the greatest care, deaths will occur from too much moisture.

Propagation.—Grafting has been recommended for Melocacti, Cereus peruvianus being the stock, and the time in the warm weather. As the juicy centre tissue of the scion contracts, and the tough epidermis does not, it is necessary to pare off the latter for at least 1″ above the point of contact. Increase may also be by seed, but this is often difficult to obtain.

Soil.—Loam two parts, crushed bricks one part.

Other Cultural Points.—Newly imported stems are occasionally lost through being given water soon after arrival. They should be kept dry for quite a fortnight. Rotten pieces should be cut back to sound tissue, and the wounds exposed to the air for a few days, to induce them to callus over.

Principal Species :—

communis, 1′ to 1½′, 12 to 20 ridges, ro. red. Melon Cactus, Turk's Cap.

Other Species :—

depressus, Jy., ro.
Ellemetii, ro.
Miquelii, 1′ to 1½′, oval.
schlumbergianus, 6″, spines wh., blk. tipped.

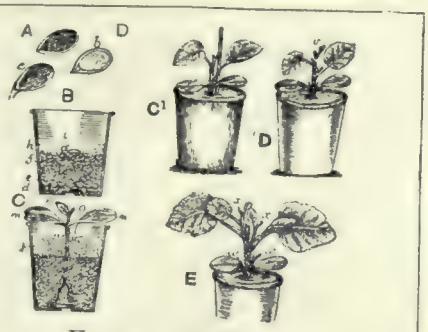
There are a number of species in Continental gardens which, so far, are strangers to this country; amœnus, goniodacanthus, humilis, Lehmanni, pyramidalis, and Zuccarinii are among them.

MELON.

The Melon (*ord.* Cucurbitaceæ) differs from the Cucumber in requiring a rather firmer soil, a higher temperature, no shade except in its earliest stages, and more air. Thus, while winter Cucumbers are obtainable, winter Melons are not; it being difficult to give them the needful conditions. Late crops of Melons, which ripen after the heat of the sun has much declined, are seldom of good quality. They are lacking in flavour, and rarely "finish" properly, although they may be of large size.

Soil.—A good, strong loam, inclining to be heavy, is the best for Melons. The top spit from an old pasture is excellent, but it should be stacked at least six months before it is used. If it is very heavy, an addition of one-fourth of leaf mould may be made, but care should be exercised in this direction, or gross, succulent growth will be the result. This applies to the fruiting plants. The seed may be sown in a mixture of three-fourths of loam and one-fourth of leaf soil.

Seed Sowing, and the Care of Young Plants.—The first batch of seed should be sown not later than the middle of January. Small, well-drained thumb pots may have one plump seed placed in each, in the middle. The pots should be plunged in a bottom heat of not less than 75°, with an atmospheric temperature of 70°. In any lower temperature, germination will be slow and uncertain. Give air cautiously as the young plants make their appearance; then, just as the first "rough" leaf makes its appearance, pot into 4½″ pots. Little firming of the soil is needed beyond a few smart taps upon the bench, and the gentle pressure of the fingers. Return the plants to the case to give them a start. Planting in the fruiting quarters may follow when each plant carries two or three large leaves. It is a mistake to allow them to become pot-bound. From the middle of January to the middle of July a sowing may be made every three weeks, to keep up the succession.



How to raise Melons.

A, seed; *b*, embryo; *c*, germinating. **B**, pot: *d*, crock; *e*, rough soil; *f*, fine soil; *g*, seed; *h*, covering; *i*, space for top-dressing. **C**, seedling top-dressed: *j*, soil; *l*, stem; *m*, seed leaves; *n*, rough leaf; *o*, growing point. **C¹**, seedling intended for a trellis, not to be stopped. **D**, plant to be trained over a bed, stopped (*v*). **E**, ready for planting: *w*, *x*, laterals.

Culture in Houses.—The best Melons are grown in pits or houses which enable the gardener to walk underneath the plants. For early crops the pits are usually "lean-to," or "three-quarter span," facing south, and about 10′ wide, made up as to 2′ 6″ for the gangway, 3′ for the back bed (usually devoted to Cucumbers), and 4′ 6″ for the front bed, where the Melons are quartered. The beds have brick sides, and pipes should run through them to keep up a supply of bottom heat. There are wider houses, and 12′ is a common width. The plants may be trained either to wires permanently fixed to the roof, or to movable wire trellises. The latter are the better, for they afford greater facilities for cleaning the house after each crop. The beds should be filled level to the top of the brickwork with fermenting material; stable litter and leaves are an excellent mixture, as they give a brisk and lasting heat. The litter should be turned twice or thrice before being placed in the house, so as to get rid of the noxious gases. It must be trodden down very firmly in order to discount, as far as possible, subsequent shrinkage. The soil

Melon Cactus (*see Melocactus communis*).
Melon, Musk (*see Cucurbita moschata*).
Melon Pumpkin (*see Cucurbita Pepo*).
Melon Thistle (*see Melocactus*).
Melon, Water (*see Citrullus vulgaris*).

may be placed on the bed in a continuous ridge near to the front of the house, or in isolated mounds, one mound for each plant. Neither ridge nor mounds should be less than 1′ high; soil may be added afterwards as the roots come to the surface. Also the soil should be in the house for three or four days prior to planting, so that it may get warm. It is courting failure to plant in cold soil. There need be no hard-and-fast rule about the distance that the plants are to be apart. Most up-to-date cultivators, however, plant rather closely —a single line, with the plants 9″ asunder. Under this system the trellis is covered quickly, and a larger and more even crop of fruit is obtained. If the plants are encouraged to make more growth, it is difficult to obtain a simultaneous "set." Planting in double lines has gone out of favour. In planting, the soil must be made very firm with a rammer; it can scarcely be too firm, unless it is very wet and pasty. Shade for about a week after planting.

Training.—Support the plants by a stake until they reach the trellis, but do not take out the points until they have climbed three-fourths of the way up it. The tips of the lower laterals may be pinched at the same time, and then the sub-laterals from these, and the unpinched laterals higher up, will be bearing female flowers at the same time.

Fertilisation.—Artificial pollination is always necessary. The stamen-bearing flower, stripped of its petals, should be thrust gently into the heart of the flower which has a small fruit at its base. The pollinated flower will soon close. Midday is the best time, and a sunny day should be chosen, the house having been kept rather dry during the forenoon. In order to ensure an even set, the blooms should all be pollinated on or about the same date. Unless this is done, one or two big fruits will "run away" from the rest, and the crop will be uneven.

Swelling and Ripening.—As the thick, white roots come through the soil, give top-dressings of rich loam, making this firm, as before, with the rammer. Liquid farmyard manure, and dustings with Le Fruitier washed in with clean water, are excellent when the fruits are as large as cricket balls. Syringe twice on each bright day; this keeps down red spider, which is the pest most to be dreaded. Shut up the house early in the afternoon—never later than 3 p.m. in the height of the summer—and do not let the night temperature fall below 60°; 65° to 70° can be easily maintained in hot weather. Plenty of moisture must be kept about until the fruit begins to ripen, when drier conditions should prevail. The fruit should be supported by pieces of flat board, 5″ square, suspended at the four corners, or by nets, from the time it is about two-thirds grown, otherwise it will fall before it is ripe. The knife should be cautiously used upon Melons, pinching with the finger and thumb being far safer. When it is desired to ripen a few fruits quickly, however, most of the stems may be cut away. The number of fruits each plant is allowed to carry must depend upon the size that is required. Two large fruits can be had from each plant, or three or four of medium size.

The Extension System.—As a rule, the plants are destroyed after they have borne one crop, but occasionally they are grown on to produce a second and even a third. The one crop system is better, although frequently healthy plants in September may be induced to bear a few later fruits after the first crop has gone, when there would not be time to replant and finish an entirely new crop.

Melons in Pots.—Where a whole house cannot be devoted to Melons, part of the bed may be made up, or a few plants may be grown in pots. Their culture does not differ from that of the planted-out specimens, except that with a less extensive root run they will require more frequent watering. A 12″ pot is a good size, and one plant only should go to each pot. If desired, the pots may be plunged in fermenting material, but it is not essential.

Cultivation in Frames.—This is not so reliable as culture in houses, but still excellent fruits are grown. Beds of fermenting material are made up as in the houses, mounds of soil are placed in, and two plants allotted to each "light" of the frame. The plants are stopped once, and two shoots from each taken on, one to each corner of the frame. Subsequently the routine of pollinating, pinching, watering, and top-dressing is carried on as for the plants in the houses. Syringing, too, is practised, but not to so great an extent, as there is more danger of rot and canker in frame plants.

In the Open Air.—Melons are not at all satisfactory subjects outdoors in this country. It is true that in hot summers the plants will fruit on a south border, beneath the shelter of a wall, but the fruits are not to be compared in flavour to those obtained from houses and frames. Moreover, the crop cannot be called a reliable one. The plants should be started in hand-lights, which may be removed when growth is being freely made.

Pests and Diseases.—Red spider is the worst insect pest; it may be kept down by syringing. If green or black fly causes trouble, the plants may be fumigated lightly. Rotting off at the collar is the most troublesome malady. To check it, dust the affected parts with powdered lime and charcoal, and do not water round the collars. A small nematoid worm sometimes attacks the crops; the only remedy is to burn the affected plants, for the worms are ensconced within the tissues, not merely in the soil. The same rather drastic treatment should be meted out for canker, whilst sulphur should be burnt in the house and all walls whitewashed before another crop is allowed inside. A very destructive mildew, Peronospora (Plasmopara) cubensis, occasionally makes its appearance. Spraying with Bordeaux Mixture or with sulphide of potassium is the most effective check. Scrupulous cleanliness in the houses is the best antidote to fungoid pests.

Varieties:—

Varieties are legion, and yet the number of really good sorts is small. A selection is given below.

Green Fleshed:—

Amberwood Beauty.
Best of All.
Hero of Lockinge.
Ringleader.
William Tillery.

Scarlet Fleshed:—

Blenheim Orange.
Read's Scarlet Flesh.
Scarlet Premier.
Sutton's A1.

White Fleshed:—

Ingestre Hybrid.
Ne Plus Ultra.
The Countess.

For the Open Air:—

Open Air.

MELOTHRIA.

Climbing herbs (*ord.* Cucurbitaceæ), needing a stove heat. They may be raised from seeds, and grown in rich loamy soil in the same way as the tropical Gourds (*see* GOURDS). They are uncommon, and chiefly found in botanic establishments.

Principal Species :—

abyssinica, per., yel., small, fruits or., round.
heterophylla, lvs. grn., margined silver, tuberous rooted : a pretty cl. (*syn.* Zehneria hastata).
pendula, ann., yel., fruits ovate globular.
punctata, lvs. grn., wh. dotted (*syns.* Zehneria suavis and scabra, and Pilogyne suavis).

MEMECYLON (*syn.* SCUTULA).

A large genus of trees and shrubs (*ord.* Melastomaceæ), whose qualifications are wholly economic. Some of the species yield valuable dyes, and edule has edible but rather astringent berries. The plants are not cultivated in Britain, and are not likely to be. The flowers are white or light blue.

MENISCIUM.

A small genus of handsome stove Ferns (*ord.* Filices), whose strong point is their beautiful venation. With the exception of simplex, which is suitable for small Wardian cases, they are all of vigorous habit, and in a state of nature are found on the borders of streams. They do best when treated as sub-aquatics, although the water must not be stagnant. Propagation is usually effected by division of the crowns in spring, the divisions being started into growth in a close case, but spores also germinate freely, and there is no difficulty in working up a stock in this way. Loam and fibrous peat in equal parts, with a few pieces of broken bricks or charcoal, suit them well.

Principal Species and Varieties :—

angustifolium, fronds 1½′ to 2′ long.
reticulatum, fronds 2′ to 4′ long, pinnate. Macrophyllum and oligophyllum are two well marked vars.
serratum, fronds 3′ to 4′ long (*syn.* palustre).
simplex, barren fronds 6″ to 9″ long, fertile ones smaller, rootstock creeping ; good for case.
Thwaitesii, fronds 8″ to 10″ long.
triphyllum, fronds 6″ to 8″ long.

Other Species :—

deltigerum (now Acrostichum virens).
giganteum, fronds 1½′ to 2′ long ; rare in cultivation.

MENISPERMUM. (MOONSEED.)

Climbing deciduous shrubs (*ord.* Menispermaceæ), not at all well known. They may be increased by root division and by cuttings in spring. A good loamy soil will do. Canadense is an excellent subject for clothing a damp and shady wall.

Principal Species :—

canadense, sum., hdy., yel., lvs. large and shield-shaped.
dauricum, 9′, Je., yel., wh., lvs. smaller than those of canadense.

MENTHA. (MINT.)

A large genus of plants (*ord.* Labiatæ), principally hardy and herbaceous in their habit, and well known from their aromatic odour, and the culinary uses of some of the species. Those most in use are piperita, the Peppermint ; viridis, the Spearmint (*see* MINT) ; and Pulegium, the Pennyroyal (*see* PENNYROYAL). Only a few are ornamental in the garden, but Requieni is a neat rockery plant, and rotundifolia variegata is a pretty variegated form ; while Pulegium gibraltarica is used for carpet bedding. Propagated by division or by cuttings in autumn or early spring, and grown in any ordinary moist soil.

Principal Species and Varieties :—

aquatica, 1′, sum., pur. (*syns.* citrata and odorata). Bergamot Mint.
— citrata, a smooth fragrant, rare var. Bergamot Mint.
piperita, 2′, aut., pur.
Pulegium, 4″, Aug., pur.
— gibraltarica, dwarfer and more compact. Gibraltar Mint.
viridis, 2′, Aug., pur.
— crispa, lvs. crisped.

Other Species :—

arvensis, 9″, Aug., pur.
canadensis, 1′, Jy., pur.
gentilis, 1′, Jy., pur.
— crispa (*syns.* dentata and pratensis crispa).
— variegata, lvs. variegated.
hirsuta, 1′, sum., pur. A sub-species or var. of aquatica.
Requieni, 1″, Jy., creeping, pur. (*syn.* Thymus corsicus).
sylvestris, 1′, Jy., pur. (*syns.* incana and lavandulacea).

MENTZELIA.

Hardy annual, biennial or perennial herbs (*ord.* Loaseæ), with white or orange flowers. The Bartonias are now included with the Mentzelias (*see* BARTONIA for cultural details). The correct name of the plant spoken of as Bartonia aurea is Mentzelia Lindleyi.

Principal Species :—

gronoviæfolia, 1′, sum., hdy. ann., yel. (*syns.* Eucnide and Microsperma bartonioides, and Mentzelia Bartonia).
Lindleyi, 8″ to 12″, spr., sum., hdy. ann. (*syn.* Bartonia aurea).
ornata, 2′, Sep., hdy. ann., wh. (*syn.* Bartonia decapetala of *Botanical Magazine* 1487).

Other Species :—

hispida, 1½′, Je., Jy., hdy. per., yel.
lævicaulis, 2′, sum., hdy. bien., yel.
oligosperma, 2′, My., Je., hdy. per., yel.

MENYANTHES. (BUCK BEAN, BOG BEAN.)

Several plants formerly included in this genus (*ord.* Gentianeæ), will be found under LIMNANTHEMUM and VILLARSIA. Trifoliata, the only member of the genus now, is a pretty native, procumbent, bog plant, with lovely fringed white flowers, produced in May. It may be planted in a bog, or close to the edge of a pond.

MENZIESIA.

Hardy, Heath-like shrubs (*ord.* Ericaceæ), from North America and Japan. They are not difficult to grow, and thrive in rock gardens or in borders if given a rather moist, peaty soil. In most cases, therefore, it is necessary to prepare the positions for them. They may be increased by dividing the strongest tufts in spring, but the operation must be cleanly performed ; also by cuttings beneath a hand-glass, and by layers.

Principal Species :—

ferruginea, 6″, My., br. pk. (*syn.* ferruginea globularis).
globularis, 2′ to 5′, My., br. pk. (*syn.* ferruginea globularis).

Other Species :—

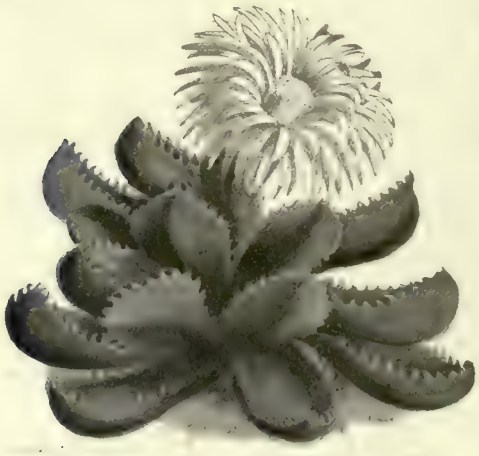
cærulea of Sweet, 2′, My., lil. (*syn.* Bryanthus taxifolius, by *Index Kewensis*).
empetriformis (*now* Bryanthus empetriformis).
glabella, early sum., pur.
polifolia (*see* Daboëcia polifolia).

Meniocus (*see Alyssum*).

Meratia (*see Chimonanthus*).

MERCURIALIS. (Mercury.)

A small genus of herbaceous plants (*ord.* Euphorbiaceæ) of no decorative value. Annua and perennis are troublesome British weeds, and the latter, the Dog's Mercury, has very poisonous properties. Cattle, however, will eat it, and deaths from this cause are constantly occurring. For this reason, if for no other, it should be pulled up from the hedgefow, where it chiefly exists, whenever it is seen.



Mesembryanthemum tigrinum (*see p.* 71).

MERENDERA.

Hardy bulbs (*ord.* Liliaceæ), closely allied to Colchicum, and needing the same treatment.

Principal Species and Varieties :—

Bulbocodium, 3″ to 4″, aut., hdy., ro. lil. (*syn.* Colchicum montanum).
— bulbocodioides, larger flowers, and a stronger grower.
caucasica, 3″, My., hdy., ro., pur.
Eichleri, close to caucasica, but segments of flower have appendages (*syn.* Colchicum Eichleri).
persica, Nov., hdy., lil., fragrant, 1½″ to 2″ across (*syn.* Aitchisoni of *Botanical Magazine*).

Other Species and Varieties :—

Aitchisoni (*see* persica).
caucasica ruthenica (*now* Bulbocodium ruthenicum or B. vernum versicolor).
sobolifera, 3″, spr., lil., referred to Colchicum procurrens by some botanists.

MERIANIA (*syn.* Danya). (Jamaica Rose.)

Stove trees and shrubs (*ord.* Melastomaceæ) from the West Indies and Tropical America. They may be treated like the Melastomas.

Principal Species :—

leucantha, 30′, wh., crim. to ro., base pur.; a shrubby tree (*syn.* rosea).

Other Species :—

Karstenii, sum., shr., deep red.

MERTENSIA.

Pretty herbaceous plants (*ord.* Borragineæ), generally hardy, and liking a rather peaty soil in slight shade, although they will grow in any common soil. Propagation, by division in spring or early autumn.

Principal Species and Varieties :—

pulmonarioides, 1½′, My., pur. bl. (*syn.* virginica). Virginian Cowslip.
sibirica, 1½′, My., pur. bl.
— alba, wh.
— atro-cærulea, dark bl.

Other Species :—

alpina, 6″ to 10″, My., pale bl.
dahurica, 9″, Je., bl.
lanceolata, 6″ to 1′, My., bl. (*syn.* alpina of *Botanical Magazine* 6178).
maritima, Jy., procumbent, bl. (*syn.* Pulmonaria maritima). Oyster Plant.
oblongifolia, 9″, spr., bl.
paniculata, 1½′, Jy., pur. bl. (*syn.* Pulmonaria paniculata).
primuloides, 9″, spr., bl.

Mercury (*see Mercurialis*).
Meriana (*of Trev, see Watsonia*).
Meriana (*of Vellozo, see Evolvulus*).

MERULIUS. (Dry Rot Fungus.)

The fungus which generally causes dry rot is Merulius lacrymans, and it is a troublesome pest once it has got a footing in the woodwork of glass or dwelling houses. The mycelium of the fungus breaks down the tissue of the wood, and spreads in large, dark coloured patches, which have the power of attracting moisture. It spores freely and spreads rapidly unless combated. Soaking the woodwork with a strong solution of corrosive sublimate, or sulphate of copper, is effective, but as well seasoned wood is less liable to be attacked than green, badly seasoned timber, it will be well to employ the former only in greenhouse construction.

MERYTA.

A small genus (*ord.* Araliaceæ) of trees from the Antipodes. They are seldom grown, but may be treated like Aralias.

Principal Species :—

Denhamii, 30′ to 40′, grh., lvs. dark grn., lighter veins (*syn.* Aralia reticulata).
latifolia, 50′ to 60′, Mch., grh., grn., yel., in clusters.
Sinclairii, 30″, lvs. large and oval, very scarce.
sonchifolia, st., lvs. dark grn., wh. spotted.

MESEMBRYANTHEMUM. (Fig Marigold, Noon Flower.)

Description.—Interesting, and often beautiful, rather fleshy plants (*ord.* Ficoideæ) of herbaceous or shrubby habit, and generally needing greenhouse protection, although a few will live outdoors in dry, sunny positions in the south. The flowers are very brilliant, but the plants ought always to be grown in full sun to show these properly. Cordifolium variegatum is a fine plant for bedding, and crystallinum is much used for garnishing.

Propagation.—By cuttings of pieces pulled off with a heel and laid on damp sand in the sun under glass; also by seeds, sown in spring in a greenhouse. Cuttings of cordifolium variegatum should be inserted in ordinary soil and kept in dry heat.

Soil.—Loam, sand, leaf soil or decayed manure with a little lime rubbish will grow the Mesembryanthemums well.

Principal Species and Varieties :—

acinaciforme, Aug., red; trailer.
candens, Je., wh., pk.; trailer.
— alba, wh.
— rosea, pk.
coccineum, 1′, Jy., sc.
conspicuum, 1′, Aug., red.

Mertensia (*of Wildenow, see Gleichenia*).
Mesechites (*see Echites*).

cordifolium, My., ann., pk. ; trailer.
— variegatum, a fine plant for bedding.
crystallinum, My., wh. ; trailer. Ice Plant.
densum, Je., pk. ; trailer.
edule, 6″, Jy., yel. Hottentot Fig.
floribundum, 6″, My., pale red.
formosum, 1′, Aug., pur.
pyropeum, the correct name, according to some authorities, of tricolor.
spectabile, 1′, My., red.
tigrinum, 4″, Aug., yel. (*see p.* 70).
tricolorum, 6″, My., ann., pk. (*syn.* tricolor of Willdenow, *see* figure).
— album, wh.

Other Species :—

adscendens, 3′, Aug., yel.
æquilaterale, 9″, sum., wh., pur. (*syn.* Rossii).
agninum, 3′, My., yel.
albidum, 6″, Jy., yel.
albinotum, 2″, Sep., yel.
aurantiacum, 1½′, Je., or.
aureum, 1′, Mch., or.
australe, 6″, Jy., pk.
barbatum, 9″, Jy., pk.
blandum, 1′, Je., wh., ro.
Bolusii, yel., red.
Brownii, 1′, Jy., pur., yel. (*syn.* micans of gardens).
caulescens, 1½′, My., red.
Cooperi, 3″, sum., pur.
cruciatum, 3″, Je., yel.
curtum, 1′, Je., wh.
curviflorum, 2′, Je., wh., ro. (*syn.* curvifolium).
deltoides, 1½′, My., pk.
diversifolium, 1′, My., yel.
echinatum, 6″, Aug., yel.
elegans, My., pur.
falciforme, 1½′, Jy., pk.
geminiflorum, 1′, My., pk.
inclaudens, 1½′, Je., pk.
linguiforme, 6″, Jy., yel.
lupinum, 2″, Jy., yel.
micans, 2½′, Jy., sc.
minutum, 4″, Oct., pk. (*syn.* nuciforme).
multiflorum, 2′, Jy., wh.
obcordellum, 1½′, Je., wh.
polyanthon, 2′, Jy., pk. (*syn.* imbricans).
pomeridianum, 1′, Aug., ann., yel.
pugioniforme, 1′, Aug., yel.
rostratum, 3″, Ap., yel.
serrulatum, 6″, Nov., pk.
striatum, 10″, My., red.
sulcatum, 2′, Aug., wh.
tenuifolium, 1′, Je., red.
uncatum, 3″, Aug., yel., red.
uncinatum, 2′, Aug., hdy., red.
violaceum, 2′, Jy., pur.

MESPILUS. (Medlar.)

The Mespiluses, which are hardy deciduous trees, now referred to Pyrus (*ord.* Rosaceæ), are best known by the common Medlar, germanica, from its edible fruits, which, when in a partial state of decay or "bletted," are sometimes eaten with sugar. They are propagated by seeds, budding, or grafting, and grow best in a rather moist loam. *See also* Medlar.

Principal Species :—

germanica, 10′ to 20′, My. wh. (*syns.* domestica and vulgaris, correctly Pyrus germanica). Common Medlar.
Smithii, 20′, My., wh. (*syn.* M. grandiflora, correctly Pyrus lobata).

MESUA.

Stove evergreen shrubs and trees (*ord.* Guttiferæ) with large, solitary, axillary flowers. Propagation, by cuttings of the half-ripened shoots, in sand, in bottom heat, in May, and by seeds in March and April. Soil, loam and peat in equal parts, with sand. The timber of ferrea is very hard and close-grained.

Principal Species :—

ferrea, 40′, Jy., Aug., wh., fragrant.

METALASIA.

Small, erect-growing, greenhouse shrubs (*ord.* Compositæ), confined to South Africa. They are of no value, and although a few species have, from time to time, been introduced, they are probably all out of cultivation.

Metachilum (*see Appendicula*).

METRODOREA.

The only species of Metrodorea (*ord.* Rutaceæ) is a stove shrub, propagated by cuttings in heat, and thriving in a compost of equal parts of loam and sandy peat. It is of no decorative worth, and even its name scarcely belongs to it, for, according to Bentham and Hooker and the *Index Kewensis*, atropurpurea should be Esenbeckia nigra.

Only Species :—

atropurpurea, 5′, st., pur. (correctly Esenbeckia nigra).

METROSIDEROS. (Ironwood, Bottle Brush.)

Description.—Usually showy greenhouse evergreen shrubs or trees, with dense inflorescences. Scandens is suitable for greenhouse walls in this country. The New Zealand robusta attains a great height in its native habitat, and an interesting account of its mode of growth as an epiphyte is given by Mr. James H. Veitch in his "Traveller's Notes."

Propagation.—By seeds, or by cuttings of small side shoots under a bell-glass in a cool, close pit or frame in spring.

Soil.—Good loam and peat in equal parts, with some silver sand and small pieces of broken pots.

Mesembryanthemum tricolorum.

Other Cultural Points.—A winter temperature of from 35° to 45° is the most suitable ; they must not be kept close in summer, but have the wood thoroughly ripened.

Principal Species :—

angustifolia, 20′, yel.
floribunda (now Callistemon salignus).
robusta, 5′, My., red (*syn.* florida).
scandens, 5′, Aug , wh.
It grows to 12′ or more on stems of Dicksonia squarrosa.
tomentosa, 30′, Jy., crim.
vera, 20′, Ap., yel., grn.

Metaxya (*see Cyathea*).
Methonica (*see Gloriosa*).

METROXYLON (*syn.* CARLISTEMON AND ANGOPHORA).

Stove Palms (*ord.* Palmæ) whose trunks contain a great deal of pith, from which the Sago of commerce is prepared, the species Rumphii and læve being the chief contributors. Propagation is by seeds and suckers. A sandy loam is the best soil, and a strong heat is required. Metroxylon of Sprengel is a synonym of Raphia.

Principal Species :—

læve Rumphii	} Sago producers.	vitiense, lvs. pinnate, prickly.

Other Species :—

elatum of gardens (now Heterospathe elata). elatum of Martius (now Pigafetta elata).

METTERNICHIA.

Two or three species of stove evergreen trees (*ord.* Solanaceæ), of similar habit to Brunfelsia, with showy flowers and shining leaves. Seeds may be sown in spring in light, sandy soil. The older plants like a compost of loam, leaf soil, and peat, in equal proportions, with sand.

Principal Species :—

principis, 3′, Aug., wh., a neat and pretty plant.

MEUM.

A pretty, tufted, hardy perennial (*ord.* Umbelliferæ) with aromatic foliage. It is not commonly cultivated, but may be easily increased by division, in spring, and will do in any ordinary garden soil. It is useful in the border, the rock garden, or on dry, sloping banks.

Principal Species :—

athamanticum, 1′ to 2′, My., hdy., wh., lvs. very feathery.

MEZEREON (*see* DAPHNE).

MICE.

There are two kinds of mice doing damage in gardens—the Vole, or Short-tailed Field Mouse (Arvicola arvalis), and the Long-tailed Field Mouse (Mus sylvaticus). Both of these are plentiful and destructive. The Vole has a much shorter tail, a rounder head, and shorter ears than the Long-tailed Field Mouse; moreover, its fur has a noticeable chestnut tinge.

In the vegetable garden, mice are very destructive amongst newly sown Peas and Beans, and if many of them are present they will quickly spoil the chances of a crop. Sprinkling the seed with oil or water and rolling in red lead prior to sowing is commonly practised as a deterrent, and this method is to be recommended as both safe and expeditious. Occasionally the rodents turn their attention to young seedling plants of various kinds, and then there is nothing for it but to trap them. In Mushroom houses they are often a nuisance, particularly when these houses adjoin stokeholes or heated sheds of any kind. They are likewise partial to ripe Grapes and Nuts.

It is amongst bulbs generally, however, that the depredations of Voles are most to be feared. Not only do they attack the bulbs in the open border, but they are very fond of nibbling those that are potted up in the autumn for forcing. It has been said that a layer of coal ashes is an efficient protection against mice, but cases frequently occur where the bulbs have been attacked whilst yet in the plunging beds. Traps should be set wherever the presence of mice—and they generally betray themselves by their odour—is suspected. The ordinary wood and wire cage trap is excellent, and a piece of toasted cheese is a good bait. A small break-back trap, which will cost about threepence, is even better, and a few pieces of Quaker Oats are an irresistible attraction. These traps can easily be set in sheds, Mushroom houses, and cold frames where bulbs are stored.

MICONIA HOOKERIANA (*syn.* PULVERULENTA, *see p.* 73).

In the open garden, the well-known "Figure Four" trap is a capital home-made contrivance, and it will be well to keep four or five of these traps set along each row of Peas and Beans. The aid of the much abused cat may be invoked for the outdoor garden, and in storehouses and vineries emptied of pot plants. A tame owl is, however, easily worth three or four cats, and as far as can be ascertained does no damage whatever.

Poisons of various kinds may be laid down, but only in places where children and domestic animals have no access. Phosphorus paste, mixed with a little lard and flour to disguise it, is a sufficiently deadly compound, and strychnine, arsenic, and white Hellebore are also employed occasionally. It is not desirable to enlist the aid of these virulent poisons except as a last resource. Two or three poisoned mice may make a stove room or greenhouse smell very disagreeably.

MICHAELMAS DAISY (*see* ASTER).

Metroxylon (*of Sprengel, see Raphia*).
Mexican Lily (*see Hippeastrum Reginæ*).
Mexican Poppy (*see Argemone*).
Mexican Tea (*see Chenopodium ambrosioides*).
Mexican Thistle (*see Cnicus*).
Meyenia (*of Nees, see Thunbergia*).
Meynia (*of Roxburgh, see Vangueria*).

MICHAELMAS DAISIES (PERENNIAL ASTERS)

1, NOVI-BELGII MRS. MARSHALL; 2, NOVÆ-ANGLIÆ PULCHELLUS; 3, NOVÆ-ANGLIÆ RUBRA; 4, AMELLUS

MICHAUXIA (*syn.* MINDIUM).

Ornamental biennial or perennial plants (*ord.* Campanulaceæ), which are of good effect in the mixed border. Propagated by seeds sown under glass in spring and afterwards planted out in the open, in any good garden soil. Tchihatcheffii is a shy bloomer.

Principal Species :—

campanuloides, 4′, Jy., bien., wh. (*syns.* nova and strigosa).
lævigata, 3′ and upwards, sum., wh. (*syns.* decandra and dodecandra).
Tchihatcheffii, 6′, sum., wh. (*syn.* columnaris).

MICHELIA.

Stove or greenhouse evergreen trees or shrubs (*ord.* Magnoliaceæ). The flowers are smaller than those of Magnolias. Cuttings of semi-matured shoots may be rooted in sand, in heat, under a bell-glass. Sandy loam and leaf mould in equal parts suit.

Principal Species :—

Champaca, 30′ to 40′, st., yel., sweet scented by day, fœtid by night.
fuscata, 2′ to 6′, grh., sum., pur., yel., more fragrant when the sun is on the flowers (*syn.* Magnolia fuscata).
lanuginosa, 12′, spr., st., pale yel.

MICONIA.

A large genus (*ord.* Melastomaceæ) of stove trees and shrubs. Many of them have handsome foliage, but few are grown in this country. Cuttings may be rooted in brisk bottom heat, in peat, in a close propagating case, in spring. Soil, loam and peat in equal parts, with plenty of sand and a few pieces of charcoal.

Principal Species :—

flammea, large, rugose, glossy grn. lvs., stem hairy; a good foliage plant.
hookeriana, olive grn. lvs., silvery mid-rib (*syn.* pulverulenta of *Botanical Magazine* 5411) (*see p.* 72).
— trifasciata, lvs. with three silvery ribs, flowers wh.
magnifica, lvs. large, rugose, bronze grn., br., ribs prominent, stem hairy. This plant is at its best when about 1½″ to 2′ high.

Other Species :—

staminea, wh. (*syn.* teysmanniana).
teysmanniana (*see* staminea).
velutina, lvs. dark grn. and wh. above, pur. beneath. A var. of magnifica, according to Rodigas.

MICRANTHUS.

Greenhouse plants (*ord.* Irideæ), with scaly corms. They answer to the same treatment as the Watsonias. The Micranthus of Wendland is a synonym of Phaylopsis, and that of Loudon is referred to Mucuna.

Only Species :—

fistulosus, Je., wh. (*syns.* Ixia and Watsonia fistulosa).
plantagineus, 6″ to 12″, Je., wh. (*syns.* Watsonia compacta and plantaginea).

MICROCACHRYS.

A greenhouse evergreen shrub (*ord.* Coniferæ), of prostrate and much-branched habit. It is endemic to the Tasmanian mountains, is rarely grown in this country, although it is very pretty, and may be treated as the Dacrydiums.

Only Species :—

tetragona. The female plants bear small bright-red cones. Strawberry fruited Cypress of Tasmania.

MICROCOCCUS.

A genus of microscopic Fungi belonging to the Schizomycetes, or Fission Fungi. This group has come into unenviable notoriety of late years, as it has been proved that many diseases which attack both plants and animals, including man, are due to their influence. They are closely allied to the Bacteria. Of the species which are hurtful to plants, amylovorus is the cause of the Pear Blight, and, so far, the only cure seems to be the excision and destruction of the affected parts. (For further particulars, *see* PEAR BLIGHT.) The cells of Micrococcus are round or oval, and have no powers of locomotion, as is the case with the Bacteria. They propagate by cell division.

MICROCYCAS.

The one species of Microcycas (*ord.* Cycadaceæ) was until recently placed with the Zamias. It may still be treated like them, only the name being altered.

Only Species :—

calocoma, fronds 3′ long, slightly hairy (*syn.* Zamia calocoma).

MICRODON.

An obscure genus of South African shrubs (*ord.* Selagineæ) of no value to gardeners. Two or three species have been introduced, but they are very rarely, if ever, cultivated, and need scarcely be described or treated culturally.

MICROGASTER.

Parasitic insects of the Braconidæ, a section of the Ichneumons. All of them are small, and although often of bright colours—black, red, or yellow—might easily be passed unnoticed. The Microgasters are all parasitic upon the larvæ of butterflies and moths, and are thus friends, rather than foes, to the gardener. The most useful species is glomeratus, whose larvæ prey upon the caterpillars of the White Cabbage Butterfly. For a long time the parasite does not seem to adversely affect the health of its host, but the death of the latter is the ultimate result. The larva of glomeratus is oval, yellow, and has a silky covering; these cocoons may often be seen in groups, 1″ across, covering the bodies of dead caterpillars. The perfect insect is black, with yellow body and legs, and four transparent wings.

MICROGLOSSA (*syn.* FRIVALDIA).

Six species of shrubs (*ord.* Compositæ), chiefly from the warmer parts of Asia and Africa. Albescens, probably the only species that has yet been introduced, may be propagated by seeds or by root division. It is hardy, and will do in almost any soil.

Principal Species :—

albescens, hdy., pale bl. or wh. (*syns.* cabulica and Aster albescens).

Michauxia (*of Necker, see Relhania*).
Micrandra (*see Hevea*).
Micranthella (*see Tibouchina*).
Micranthera (*see Tovomita*).
Micranthus (*of Wendland, see Phaylopsis*).
Microchilus (*see Physurus*).
Microgenetes (*see Phacelia*).
Microgonium (*see Trichomanes*).
Microgramme (*see Polypodium*).

MICROLEPIA (*see* DAVALLIA).

MICROLICIA.

A large genus (*ord.* Melastomaceæ), but horticulturally a worthless one. Most of the species are erect stove shrubs.

MICROLOMA.

Stove evergreen twining shrubs (*ord.* Asclepiadeæ) from the Cape. The flowers are bright-hued, but small, and the plants are rarely grown. Small side shoots may be rooted in sand, in bottom heat, in April. Soil, loam and leaf mould in equal parts, with one-fifth sand.

Principal Species :—

lineare, Jy., st., blood red. sagittatum, st., Jy., sc.

MICROMERIA (*syns.* PIPERELLA, SABBATIA, and TENDANA).

Hardy or half-hardy shrubs or herbs (*ord.* Labiatæ). There are many species, but only a few are of any value. Those named are all pretty, hardy, rockery plants. Propagation is by cuttings, and the soil should be fairly light and rich.

Principal Species :—

croatica, sum., ro., vio.
græca, Je., sub-shr., pk., fragrant.
juliana, shr., pale red, very small.
Piperella, 3″, Aug., Oct., sub-shr., pk. This species is not quite hdy., and needs a little protection in cold districts in winter.

MICROMYRTUS.

Greenhouse shrubs (*ord.* Myrtaceæ), all from Australia. Very few of the species have been introduced; probably microphylla is the only one, and even it is rare. Propagation, by ripe or partly ripe shoots, in a close frame. Soil, sandy loam two parts, leaf mould one part.

Principal Species :—

microphylla, wh., small; a much branched shr.

MICROPHŒNIX.

Two hybrids only have so far been described and placed in this genus (*ord.* Palmæ), and they may be given the same treatment as Phœnix, to which the genus is closely related.

Hybrids :—

decipiens. According to Carrière this name was given by Naudin to the result of a cross between Phœnix dactylifera and Chamærops humilis. This hybrid was raised by a grower at Hyères.
Sahuti (M. decipiens × Trachycarpus excelsa), foliage of decipiens, and vio. petioles of T. excelsa).

MICROSERIS (*syns.* BELLARDIA, CALAIS, LEPIDONEMA, and UROPAPPUS).

Greenhouse or hardy, annual or perennial herbs (*ord.* Compositæ), of no garden value, with the possible exception of Lindleyi. This hardy, yellow annual has been introduced, but is probably now lost to cultivation.

MICROSTYLIS (*syns.* ACHROANTHES, CREPIDIUM, and PEDILEA).

Stove terrestrial Orchids (*ord.* Orchidaceæ), allied to Malaxis. The culture closely approaches to that given to the deciduous Calanthes, viz. plenty of water, and a decided rest in winter. Fibrous peat and live sphagnum form a good compost. Drainage must be liberal.

Principal Species :—

calophylla, 9″, sum., yel., greenish br.
congesta, 12″, sum., grn., yel. Fusca (*syn.* trilobulata) is a pur. var.
discolor, 9″, sum., yel., or., lvs. reddish pur., margined grn. A singularly beautiful species.
josephiana, 12″, spr., yel., relatively large.
Lowii, pur., lvs. dark metallic br., striped wh.
macrochila, 15″, sum., yel., lip reddish pur., relatively large.
metallica, 9″, sum., ro. pur., yel., lvs. grn. above, ro. beneath.
purpurea, 9″, sum., yel., pur., lvs. dark crim. upper surface, reddish grey lower.
Scottii, 6″, sum., yel.
Wallichii, 9″, sum., grn., yel., or pur., lvs. grn., sometimes shaded pur.

Other Species :—

chlorophrys, pur.
histionantha, brownish grn.
plantaginea, pur. (*syn.* bella).
ventilabrum, yel.
versicolor, 1′, Je., Oct., flowers various.

MIGNONETTE. (RESEDA ODORATA.)

Description.—The Mignonette (*ord.* Resedaceæ) is such a favourite where sweet-smelling flowers are appreciated, that it would be a waste of space to describe its characteristics. Every garden should possess it, treated as an annual in the borders or beds, and grown in pots under glass. Trained as "Tree Mignonette" it is decorative, and is much appreciated by some.

Propagation.—By seeds, sown as directed for the several uses.

Soil.—A good loamy soil is preferred by Mignonette outdoors, and in light and poor soils manuring with well-decayed cow manure is necessary to obtain good results. In poor or very dry soils the seeds often fail to germinate well.

Mignonette in Borders.—Sowings should be made where the plants are to bloom, at intervals from the end of April to early in July, so as to have a succession of flowers. Thinning out ought to be early attended to. Water frequently in dry weather.

In Pots.—For early bloom sow thinly in March and onwards in good, loamy soil, thinning out the plants well. For autumn and winter bloom to succeed outdoor flowers, sow at the end of August and in September in a cold frame, having three or four plants in a 5″ pot, afterwards removing the pots to a light, airy greenhouse, near the glass, with a temperature of 50° to 55°. Ventilation must be given on every possible occasion, or the plants will be very weak.

In Tree Form.—Sow the seeds very thinly in 3″ pots in soil composed of one part of decayed cow dung and two parts of good mellow loam, to which has been added some sand and finely sifted mortar rubbish. Grow as directed for pot cultivation, but eventually leave only the strongest plant in each pot, supporting it by a stick to keep it straight. As growth proceeds, pinch off the side shoots at the second joint. Some of these side shoots may be gradually removed as the plant gains vigour. When the small pots are filled with roots give a

Micromeles (*see Pyrus*).
Micropera (*see Sarcochilus*).
Micropetalon (*see Stellaria*).
Micropiper (*see Peperomia*).
Microsperma (*see Mentzelia*).
Microstephium (*see Cryptostemma*).

Midnapore Creeper (*see Rivea hypocrateriformis*).
Miegia (*see Arundinaria*).

shift, this process being repeated as the roots require fresh feeding ground, though it should not be done after the end of September.

Varieties :—

There are now many vars., including some with yellowish blooms, and others with flowers which have a distinctly reddish hue. Bush Hill White, Covent Garden Favourite, Giant White, Golden Gem, Golden Queen, Machet, Miles' Spiral, and Victoria Crimson are all good. Urania is a fine new red var.

MIKANIA.

In this large genus (*ord.* Compositæ), most of the members are stove evergreen climbers. They are allied to Eupatorium, and answer to the same cultural attention as that bestowed upon the stove species of that genus. Scandens will do in the open air in summer, and likes a wooden trellis to ramble over.

Principal Species :—

Sanderi, lvs. large, bright grn., bronze pur.

scandens, sum., warm grh., yel., wh.

Other Species :—

amara, sum., bl. (*syn.* Guaco).

apiifolia, sum., yel., lvs. dark grn.

MILDEW.

A popular name applied to a number of microscopic fungi which cover the epidermis of the plants upon which they are parasitic with a meal-like powder. The name may have come from the German *mehl-thau*, or meal-dew, in reference to this meal-like deposit. There are several genera and many species of mildews, and they attack both wild and cultivated plants. They are commonly given the generic name of Oïdium, and grouped thereunder as species, and yet it is almost certain that in not a few cases they are only a phase in the life history of much more highly organised fungi.

Of the mildews which are commonly found in gardens, Oïdium Tuckeri attacks the Grape; O. Balsamii is to be found on Turnips; Sphærotheca pannosa is injurious to Peaches and Roses; S. Castagnei, to Hops, and many wild plants; Podosphæra Oxyacanthæ attacks the Hawthorn; Erysiphe Martii, Peas; E. communis, and E. Cichoracearum, various garden plants; Microsphæra Berberidis, the Barberry; and M. Grossulariæ, the Gooseberry. All are more or less harmful, particularly in the case of Vines, Peaches, Roses, and Chrysanthemums, when bad attacks bring about the untimely fall of the leaves, and hinder those leaves which do not fall from the proper performance of their functions.

There is no better treatment for mildew than dusting with flowers of sulphur. Brought into contact with the spores, the sulphur does its work well, checking the spread of the disease. For light attacks upon all plants, a dusting of sulphur is to be advised. It may be applied through a special sulphur blower, such as the "Malbec," but several applications may be necessary. Chrysanthemums, in early spring, are liable to mildew if the weather be cold and damp. The first spots should be watched for and dusted over. The same advice applies to Cinerarias, which are frequent sufferers. Roses are best kept mildew proof by mixing a little sulphur with the water used for syringing; this plan is followed with

Photo: A. H. De'Ath, Ashford.

MIGNONETTE FINELY GROWN IN POTS (*see p.* 74).

conspicuous success by many of those who grow pot Roses for market. Peaches and Nectarines may be syringed in the same manner.

For Vines, if dusting with flowers of sulphur fail, the more drastic plan of sulphuring the pipes, making them hot, and keeping the house dry for a few days, must be put into practice. The sulphur fumes liberated by the heat from the pipes will kill the spores and mycelium, but will also damage the leaves if continued for longer than two or three days, or if the pipes be made so hot that the house smells strongly of sulphur. This remedy should only be applied as a last resource.

There are certain conditions which tend to the spread of the fungus. These are :—

(1) A cold, water-logged soil.
(2) A moisture-laden, stagnant atmosphere.
(3) Cold draughts.

Injudicious watering and ventilating are largely contributory to such conditions. If wet, cold weather follow a dry, warm spell, a little heat in the pipes may be necessary in Vineries and Peach houses even in the height of summer. Frequent and violent fluctuations in the temperature of houses are also to blame, and the greatest care must be exercised in giving air when keen winds are blowing while the sun is bright and warm. Often Rose trees that take mildew badly may be cured sometimes by lifting the roots out of cold, inert soils into which they may have penetrated.

Mildew on Peas is generally induced by spells of drought. Late Peas are always the worst, and upon very light soils mildew is sure to be troublesome ; also upon cold, clayey soils in wet seasons. The remedy is deep and thorough cultivation. It is also well to grow varieties of vigorous habit only for late work.

Spraying with Bordeaux Mixture and potassium sulphide (liver of sulphur) is excellent. (*See* FUNGICIDES.)

MILLA.

Millas (*ord.* Liliaceæ) are pretty bulbous plants, some of which can be grown in a border of dry soil close to a wall or in a frame. The best known is uniflora, which is hardy in most gardens in sheltered positions, but prefers to be planted in gravel. Propagation, by offsets or seeds. (*See also* BRODIÆA, to which some are now referred.)

Principal Species :—

biflora, 1½′, My., grh. or frame, wh.
Leichtlini, 4 , win., grh., wh. (correctly Brodiæa Leichtlini).
macrostemon, 10″, lil. (*syn.* Nothoscordum macrostemon).
porrifolia, 10″, bl., wh. (correctly Brodiæa porrifolia, *syn.* Triteleia porrifolia).
uniflora, 9″, Mch., wh. (correctly Brodiæa uniflora).
— violacea, 9″, Mch., lil. (correctly Brodiæa uniflora violacea).

MILLETTIA.

Tall, climbing trees or shrubs, with purple, pink, or white flowers (*ord.* Leguminosæ). Several species have been introduced, of which caffra, Maingayi, megasperma, and racemosa are in cultivation at Kew. Propagation, by seeds and cuttings in sand. Soil, equal parts of loam and leaf soil, with sand.

Principal Species :—

japonica (of Asa Gray, correctly Wistaria japonica).
megasperma, pur., lvs. pinnate, glossy grn. ; habit like Wistaria sinensis.

MILLINGTONIA.

Stove evergreen trees (*ord.* Bignoniaceæ), with rather showy white or yellow flowers. (For cultural details, *see* BIGNONIA.)

Principal Species :—

hortensis, 35′ to 40′, wh.
simplicifolia, 20′, yel.

MILTONIA VEXILLARIA MEMORIA G. D. OWEN
(*see p.* 77).

MILLIPEDES.

The members of this group of Myriapoda are well known to gardeners, and occasionally they prove somewhat destructive. They feed upon decaying vegetable matter, but sometimes attack the roots of cultivated plants, fallen fruits, and Strawberries. Julus guttatus and J. terrestris are common ; so also is Polydesmus complanatus, the flattened millipede. In this country 2″ would be the maximum of growth, but in other lands many species are 6″ long and upwards. None of the millipedes possess poison tubes, although they are popularly regarded as dangerous.

Milfoil (*see Achillea*).
Milk Vetch (*see Astragalus*).
Milk Weed (*see Asclepias*).
Milk Wort (*see Polygala*).
Milk Wort, Sea (*see Glaux*).
Millet Grass (*see Paspalum and Sorghum*).

Where they are observed to be doing harm, traps of pieces of Carrot will catch a good many, and by occasionally lifting pot plants that are stood upon the ground, others may be caught. Deep trenching of the soil is an excellent cure.

MILTONIA.

Description.—In this genus (*ord.* Orchidaceæ) are some of the showiest of Orchids, vexillaria and its hybrids rivalling the Cattleyas in size and effect. All are dwarf, the flattish pseudo-bulbs being surmounted by several stiff leaves, that, in the group referred to, are of a curious greyish-green colour. The flowers are always flat, and the lip is very large. The flowers of vexillaria are too lumpy for artistic effect when cut, and they do not last so well in water as those of candida, etc.

Compost.—For the vexillaria group, including Roezlii and bleuana, sphagnum forms the chief item, mixed with a little peat fibre and sand. For the cooler growing forms, fibrous peat with a little sphagnum suffices. In all cases efficient drainage is essential.

Propagation.—By division at the time of potting.

Temperature.—Roezlii and bleuana are only successfully grown at the cool end of a stove, the former plunged in live sphagnum and the latter suspended from the roof or elevated towards it. Candida, spectabilis and varieties, cuneata, etc., can be grown all the year round in a cool house, but are the better managed if given a few degrees more warmth during winter, the cool end of a Cattleya house suiting them. Vexillaria is best grown in a light position in an intermediate house where abundance of air can be admitted during summer.

Other Cultural Points.—Differences of opinion prevail as to the best time for potting, but where atmospheric conditions are fairly favourable no mistake can be made if potting is done as soon as the plants begin to make new growths. Use small pots or pans for the erect-growing forms, but broader receptacles for spectabilis and its varieties. Though never deciduous, Miltonias require very little water at the roots when there is no apparent growth. Moisture in the atmosphere must always be maintained, according to the time of year, frequent damping between the pots and on the stages being necessary when evaporation is rapid.

Diseases and Pests.—Too low a temperature, or excessive water in winter, will turn the tips of the leaves brown or black. Thrips are a great pest, and must be opposed with vaporising compounds, sponging with tobacco solution, and dusting with tobacco powder. Cotton-wool wrapped round the spike will deter slugs.

Principal Species, Varieties, and Hybrids :—

bleuana, 1¼′, My., wh., lip wh., br. blotch, yel. disc, hybrid (vexillaria × Roezlii). The finest member of the genus; aurea, nobilior, rosea gigantea, and virginalis are all beautiful forms.

candida, 1½′, Aug., reddish br., yel., wh.; grandiflora is a superior form.

Clowesii, 2′, aut., br., yel., wh., pur.

cuneata, 1½′, spr., br., yel., wh., ro. (*syn.* speciosa).

lamarcheana, 1½′, aut., br., yel., pur., hybrid (Clowesii × candida); joiceyana is similar to, and must be regarded as a form of, lamarcheana.

Phalænopsis, 1′, My., wh., pur. (*syn.* pulchella).

Roezlii, 1′, aut., wh., pur. blotches, yel.

schröderiana, 1′, Sep., br., yel., pur., wh., fragrant.

spectabilis, 9″, sum., blush ro., lip pur. Numerous vars., the finest being bicolor, moreliana, atro-rubens, radians, and virginalis.

travassosiana, 1½′, Sep., yel., pur., a form of, or hybrid from, Regnelli.

vexillaria, 1¼′, spr., variable species, wh. to deepest red rose, yel. or. disc. The choicest forms are albicans, cobbiana, Daisy Haywood, Fairy Queen, Leopoldii, measuresiana, Memoria G. D. Owen, (*see p.* 76) Princess May, rubella, splendens, and superba.

Other Species, Varieties, and Hybrids :—

Binoti, 1½′, sum., yel., br., pur., lil., hybrid (candida × Regnelli).

Bluntii, 1′, aut., yel., reddish br., pur., hybrid (spectabilis × Clowesii).

— lubbersiana, larger and brighter.

— peetersiana, pur., yel.

Cogniauxiæ, 1′, aut., vio., pur., wh., hybrid (spectabilis moreliana × Regnelli).

Endresii, 1¼′, spr., wh., red, yel.

festiva, 9″, sum., pale yel., pur., hybrid (spectabilis × flavescens).

flavescens, 1½′, sum., yel., lip yel., pur. (*syn.* stellata).

joiceyana (*see* lamarcheana).

moreliana (*see* spectabilis).

leucoglossa, 9″, aut., wh., grn., pur., hybrid (spectabilis × candida).

peetersiana (*see* Bluntii var.).

pulchella (*see* Phalænopsis).

Regnelli, 1½′, aut., wh., ro., pur.

— aurea, yel.

— purpurea, deep colour.

russelliana, 1¼′, sum., reddish br., yel., wh.

speciosa (*see* cuneata).

stellata (*see* flavescens).

Warscewiczii, 1¼′, spr., br. pur., wh., lip br. pur., lil. (*syn.* Odontoglossum fuscatum).

— Weltonii, brighter.

— xanthina, shaded with yel.

MIMETES.

Greenhouse evergreen shrubs (*ord.* Proteaceæ), all from South Africa. They are of little decorative value, and are rare in cultivation. Increase is by cuttings of the ripened shoots in autumn, or before growth starts in spring. No bottom heat is required. Soil, peat and loam in equal parts. Plenty of moisture is needed.

Principal Species :—

Zeyheri, 6″ to 8″, Jy., bracts rosy red (*syn.* Orothamnus Zeyheri of *Botanical Magazine* 4357).

MIMICRY.

In their war against enemies, numerous insects mimic certain features of their environment or of other plants or animals. Mimicry may be protective or aggressive. In the first case an insect may develop a certain colour, such as that of the leaves upon which it lives, to assist it in escaping; in the second the colour may be employed to assist it in catching its prey. Warning colours are exhibited by some insects which are unpalatable to others, to prevent the latter mistaking them for palatable food. The looper caterpillars, and the Thorn Moth Caterpillar, which fasten themselves to twigs and imitate them by remaining perfectly rigid, are good examples of protective mimicry. The Indian Mantis, which, feeding exclusively upon insects, flattens itself against the trunk of a tree, and stretches out its wings and legs to resemble a pink flower, thereby luring its prey towards it, is an instance of aggressive mimicry.

MIMOSA.

This large and widely distributed genus (*ord.* Leguminosæ) enters little into British gardening. The "Mimosa" sold in the London streets in spring is Acacia dealbata (which *see*). Most of the Mimosas have leaves more or less sensitive to the

touch, and quickly respond to irritation. As far as the true Mimosas are concerned, the popular Sensitive Plant, pudica, is the representative. It is a pretty little perennial, usually treated as an annual, with feathery leaves. The way in which the pinnæ of the leaves droop upon being touched is a source of interest to many, and the plant is grown solely on this account. Seeds may be sown in spring, in brisk heat, and the plants potted on in a mixture of two parts loam, one part leaf mould, and one-sixth sand. Pot loosely and drain well. A stove heat is needed in the earlier stages, but in summer the plant will do moderately well in a window or a cool greenhouse. The other species may also be propagated by cuttings. The true Sensitive Plant is sensitiva, but it is scarcely so sensitive as the common pudica.

Principal Species :—

marginata, sum., pur., flower heads very long. A good plant for the roof of the stove.
pudica, 1′ to 1½′, sum., per., ro. Humble Plant, popular Sensitive Plant.
sensitiva, 3′ to 6′, sum., pale pur., stems prickly. True Sensitive Plant.

Other Species :—

scandens (now Entada scandens).

Photo: Cassell & Company, Ltd.

MIMULUS CARDINALIS (*see p.* 79).

MIMULUS. (MONKEY FLOWER.)

Description.—Pretty, hardy or half-hardy herbs, which thrive best in rather moist soil. The garden

varieties, said to have originated from cupreus, and named maculosus, are very effective and wonderfully marked. The "Hose-in-hose" are interesting varieties. Moschatus is the popular Musk. It and its forms are sometimes used for bedding in shady places.

Propagation.—By seeds in the case of the annual and perennial species; the latter also by division or by cuttings. The seeds are small, and should be only lightly covered with fine soil, or with a little silver sand.

Soil.—Common soil of a moist character for the non-shrubby species.

Other Cultural Points. — All the Mimuluses make nice pot plants, and this is the best way to grow cardinalis in the colder districts. Glutinosus is an old pot plant, which is all the better for being planted out during the summer.

Principal Species and Varieties :—

cardinalis, 1′ to 3′, Je., sc., hdy. per. (*see p.* 78). Several vars., with flowers from sc. to pale yel. Pictus is fine.
— grandiflorus, new large-flowered form.
cupreus, 6″ to 12″, sum., hdy. per., or. crim. Many vars., as Brilliant, Prince Bismarck, and the maculosus vars. Some authorities make this a form of luteus.
glutinosus, 5′ to 8′, in bloom almost all the year in grh., buff (*syns.* aurantiacus and Diplacus glutinosus).
— puniceus, 5′ to 8′, or. red.
moschatus, 9″, grh., Je., yel.
— compacta.
— Harrisoni. Harrison's Large-flowered Musk.

Other Species and Varieties :—

alatus, 1′, Jy., hlf-hdy., bl.
Burnetii, 1′, Jy., hdy. per., or., hybrid.
floribundus, 9″, Aug., ann., yel.
Fremontii, 4″, sum., hlf-hdy. per., crim.
glabratus, Je., yel.
lanatus, 1½′, Je., yel.
Lewisii, 9″, Aug., ro. pur. (*syn.* roseus).
luteus, 1′, Jy., yel., hdy., herbaceous.
— alpinus, various (includes Roezlii and Tillingii).
— guttatus, 1½′, Jy., yel. (*syn.* guttatus).
— rivularis, 1′, Jy., yel.
mohavensis, 3″, sum., ann., wh., crim. eye.
primuloides, 4″, sum., hdy. per., yel.
radicans, 2″, sum., wh., vio., bog.
repens, 9″, grh., hlf-hdy. per., lil., yel.
ringens, 2″, Jy., bl.

MIMUSOPS (*syn.* SYNARRHENA).

Stove trees with milky juice (*ord.* Sapotaceæ), leathery leaves, and globose, edible berries. Very few are in cultivation. Cuttings of thoroughly ripened shoots may be rooted in brisk but moist heat. Seeds may also be sown. Soil, sandy loam two parts, peat one part.

Principal Species :—

Elengi, 50′, sum., flowers wh., fragrant, fruits yel.
Kauki, 30′, flowers wh. (*syn.* dissecta of *Botanical Magazine* 3157).

MINA LOBATA (*see* IPOMŒA VERSICOLOR).

MINT (*see* MENTHA).

Of the three species of Mint used for culinary or other purposes the one most in request is viridis, the Spearmint, which is easily grown in good, rather moist soil. Propagation, by division of the clumps in early spring. Replant them about 9″ apart. Offsets in spring and cuttings in summer are also resorted to. Forcing is easily performed by placing the roots in boxes of good soil in a temperature of 60°, and keeping them well watered. Tops may be cut and dried where the conveniences for forcing are not at command.

M. piperita yields the Peppermint of commerce, which is chiefly obtained by distillation from the tops of the plant. It may be grown in the same way as the Spearmint. The proper time to cut the Peppermint is just when the tops are coming into flower.

In growing these Mints, it will be found useful to water the beds well in dry weather, and to top-dress with fresh soil once a year.

MIRABILIS (*syns.* JALAPA and NYCTAGO). (MARVEL OF PERU.)

Greenhouse and hardy perennial herbs (*ord.* Nyctagineæ). The Marvel of Peru, Jalapa, is a favourite garden plant; but, although really a perennial, it is treated as a half-hardy annual. Seeds sown in spring, in heat, give nice, sturdy plants by the beginning of May. These, if planted then on a south or west border, soon make tall, bushy plants, that flower freely. Any fairly good garden soil will do, but the best results are obtained in a light, rich medium. The roots are tuberous, and may, if desired, be taken up in the autumn and stored in the same way as Dahlias. Seed may be obtained in separate colours—yellow, rose, pink, white, or striped.

Principal Species and Hybrid :—

hybrida, 2′, Jy., hlf-hdy., wh., a hybrid, probably Jalapa × longiflora.
Jalapa, Marvel of Peru, 2′ to 3′, sum., hlf-hdy.; flowers various, fragrant.
longiflora, 2′ to 3′, Jy., hdy., wh., pk., or vio., fragrant.
multiflora, hdy., pur. flowers very long.

Other Species :—

dichotoma, 2′, Jy., grh., yel.; flowers open in the afternoon.

MIRBELIA.

Greenhouse shrubs (*ord.* Leguminosæ), all Australian. Propagation, by cuttings and seeds. Soil, peat and loam in equal parts, with one-sixth sharp sand. Pot firmly. The plants should be pruned back after flowering is over.

Principal Species :—

dilata, 3′, My., Aug., pur.
grandiflora, 1′ to 2′, My., yel.
reticulata, 1′ to 3′, My., Aug., lil.
speciosa, 1′ to 2′, My., Jy., pur.

MISCANTHUS (*syn.* MISCHANTHUS).

These, formerly known as Eulalias, are handsome Grasses (*ord.* Gramineæ), of great beauty in the border or in grass. They like a good, moist soil, and are propagated by division or by seeds in spring.

Principal Species and Varieties :—

sinensis, 5′ (*syn.* Eulalia japonica, *see p.* 80).
— univittata.
— variegata, striped wh.
— zebrina, yel. bars across lvs.

Mindium (*see Michauxia*).
Mint, Mountain (*see Pycnanthemum*).
Mint, Tree (*see Prostanthera*).

Minuartia (*see Arenaria*).
Miquelia (*of Blume, see Stauranthera*).
Miraculous Berry (*see Sideroxylum dulcificum*).
Mischanthus (*see Miscanthus*).

MISTLETOE.

An interesting, semi-parasitic, shrubby evergreen (*ord.* Loranthaceæ) found growing on Apple, Hawthorn, Lime, Populus, species of Pyrus, sometimes on the Oak (*see p.* 81) and many other trees. The Mistletoe favours a somewhat moist climate; hence a difficulty is often experienced in establishing it in a dry district. This difficulty is considerably augmented by sowing immature seed.

Photo: Cassell & Company, Ltd

MISCANTHUS SINENSIS (*see p.* 79).

The fruits are not ripe until the end of February, when they may be rubbed on to the under side of clean young branches; no cut is necessary, and the seed will adhere to the bark by its gelatinous envelope. Only two green cotyledons or seed leaves are produced the first season, and growth is slow for several years. The male and female flowers are produced on different plants, necessitating several colonies to ensure a crop of berries.

To rid a tree of established Mistletoe is almost a hopeless task. Constant excision is imperative. (*See also* VISCUM.)

Miscopetalum (*see Saxifraga*).
Mistletoe Cactus (*see Rhipsalis*).

MITCHELLA.

Creeping herbs (*ord.* Rubiaceæ). Repens, the only species introduced to this country, is a pretty plant for the outdoor rockery; it may be increased by root division in spring, and is not particular as to soil, as long as it is light and moist.

Principal Species :—

repens, sum., hdy., wh. flushed pur., fragrant.

MITELLA.

Pretty little, white-flowered hardy herbs (*ord.* Saxifrageæ), suitable for rockeries or borders in a moist, peaty soil. They are propagated by division, or rarely by seeds. They prefer a little shade.

Principal Species :—

diphylla, 6″, Ap., wh.
nuda, 6″, Je., wh. (*syns.* reniformis, prostrata, and cordifolia).
pentandra, 6″, My., wh.

MITES.

These are popularly classed as insects, but strictly speaking they are animals, closely related to spiders. They differ from spiders in having the abdomen closely joined to the body instead of connected by a constricted passage. The troublesome

"Red Spider" (which *see*) belongs to the mites. The Harvest Bug (Tetranychus autumnalis) is a small, brick red animal, invisible to the unaided eye, but present in great numbers in the vegetable garden as well as in hay and corn fields. These "bugs" are very troublesome, as they set up a swelling and unpleasant itching where they fix upon the skin. Sulphur ointment, benzine, and carbolic acid are the remedies recommended.

The plant mites are divided into the Tetranychidæ, or eight-legged mites, which suck the juices of plants; and the Phytoptidæ, or gall mites, which have nearly colourless and rather slender bodies, and two pairs of short legs.

The Tetranychidæ are semi-transparent and white, yellow, or red. They spin webs, which turn yellow or dirty white, and are quite conspicuous. Many greenhouse and hardy plants suffer from the attacks of these mites, and kerosene emulsion, soft soap and sulphur, and Quassia solutions are the best specifics. (*See* INSECTICIDES.)

Phytoptidæ, or gall mites, are even more difficult to deal with. Phytoptus Ribis forms the destructive Big Bud in Black Currants. (*See* BLACK CURRANT MITE.) The Erineum galls on the Apple, Maple, Birch, and Beech, to mention only a few trees, are also the work of mites. The Wart or Nail galls, common upon the upper surface of the leaves of Limes, Maples, and Willows, are other instances. These, however, seem to do comparatively little harm. It is the Bud galls that are most to be dreaded. It is exceedingly difficult to deal with them, for the mites live between the scales of the buds, and the larvæ are protected by them in such a way that no insecticide can reach them. Vaporising with hydrocyanic acid has been tried, but it is dangerous to use, and has not yet proved effective.

Photo: D. S. Fish, Edinburgh.

MISTLETOE ON QUERCUS PALUSTRIS.

MITRACARPUM.

Annual or perennial herbs with rather small, white flowers (*ord.* Rubiaceæ). Very few of them are ever seen, and none is of any decorative value. Stylosum is a stove annual, and succeeds in loam, peat, and sand.

Mitopetalum (*see Tainia*).

MITRARIA (*syn.* DIPLOCALYX).

The principal species (*ord.* Gesneraceæ) is a rather variable evergreen shrub of easy culture and considerable beauty. It may be increased by root division in spring, and by cuttings rooted under a bell-glass, in light soil, at any time during the spring or summer. Soil, fibrous peat and sand. Free drainage and a cool and shady situation are essential.

Principal Species :—

coccinea, My., Jy., hlf-hdy., sc.

MITRIOSTIGMA.

Two species of stove shrubs (*ord.* Rubiaceæ). They are closely allied to the Gardenias, with which they are usually placed, and are subject to the same cultural treatment.

Principal Species :—

axillaris, 5′, spr., st., wh., fragrant (*syn.* Gardenia citriodora).

MODECCA.

An obscure genus (*ord.* Passifloreæ) of stove evergreen climbing shrubs, of no garden value, and rarely, if ever, grown. In habit they resemble the Bryonias.

MODIOLA.

Hardy creeping or trailing herbs (*ord.* Malvaceæ), of no value. Multifida is sometimes grown in botanic gardens. The correct name of geranioides is Malvastrum Gilliesii, or Modiolastrum geranioides, according to *Kew Hand-List*.

MŒHRINGIA.

Hardy herbaceous perennials (*ord.* Caryophylleæ), placed by the authors of the *Genera Plantarum* under Arenaria, like the members of which genus the plants may be treated.

Principal Species :—

muscosa, 3″ to 4″, sum., hdy., wh., small, axillary, and solitary. Muscosa of Linnæus is referred

Mitrastigma (*see Plectronia*).
Mitre Wort, False (*see Tiarella*).
Mnemosilla (*see Hypecoum*).
Mock Orange (*see Philadelphus*).
Mock Privet (*see Phillyrea*).
Mocker Nut (*see Carya tomentosa*).

to Arenaria sperguloides, and muscosa of Lucé to Sagina procumbens by *Index Kewensis*.

MOHRIA. (Frankincense Fern.)

There is only one species in this genus of Ferns (*ord.* Filices), and it is a pretty greenhouse plant with scented fronds, and the habit of a Cheilanthes. Propagation is by spores, which are freely produced. Soil, fibrous peat and sand, with a few pieces of sandstone and charcoal. Mohrias have been declared difficult to grow, but they are not so if given free drainage, soil as above, a light shelf in a cool greenhouse, and a fair amount of water at the roots and none overhead. They detest syringing.

Only Species and its Variety :—

caffrorum, fronds 6″ to 18″ long, 2″ to 4″ broad, tripinnatifid (*syn.* thurifragra).
— achilleæfolia, fronds very finely cut.
thurifragra (*see* caffrorum).

MOLDENHAWERA (*syn.* Dolichonema).

A small genus of stove trees (*ord.* Leguminosæ) of little garden value. Probably none of the species is now in cultivation, although floribunda has been introduced.

MOLE.

Although the mole (Talpa europæa) is carnivorous, as is evidenced by its teeth, and despite the fact that it feeds upon various insects and their larvæ, and earthworms, and might therefore be reckoned in some measure a friend of the gardener, its habits of burrowing under lawns and grass paths more than outweigh any good it might do. Its home is generally in some dry, secure place, such as underneath the roots of a tree, or beneath a large stone, but it makes its runs for long distances from its headquarters, and where they are upon the lawn they interfere seriously with the work of the mowing machine. The female makes a nest of dried grass or leaves, and brings forth four or five young ones at a birth. Although moles are popularly regarded as being blind, they have eyes, which are, however, small and deeply seated. On the other hand, their powers of hearing and smell are very acute. It is well, therefore, when setting traps for them, that the operator should wear gloves.

Steel spring traps are commonly used ; they can be obtained for a few pence each, and have quite superseded the wooden spring and string traps which mole catchers of the old school were wont to use.

The traps should be set carefully in the principal run, all loose earth knocked into the passage during the process being removed, so as to give no warning of the obstruction. Also the light should be carefully excluded by packing earth or grass about the trap outside. Neglect of this little item will mean failure. Where many moles are present it will be well to call in a professional mole catcher, but for one or two there is no need to do this.

MOLE CRICKET.

This curious-looking insect, which is one of the Gryllidæ (*ord.* Orthoptera), is dun brown above, yellowish red below, and has a peculiar velvety gloss. The popular name of Mole Cricket is not due to the gloss, but to the resemblance that the two front legs bear to those of a mole. They are, in fact, meant to serve the same end, viz. that of digging and burrowing. The female's nest is underground, and contains from 200 to 400 eggs. From the egg to the perfect insect takes a period of from two to three years. While the Mole Crickets feed to a considerable extent upon insects and worms, they also prey upon the roots of Potatoes, Potherbs, and various flowers, so that to this extent they must be classed as enemies. They are found most frequently upon light, sandy soils, rarely upon cultivated ones. Pieces of raw meat may be inserted in the soil as traps, each piece with a stick attached, or petroleum may be poured into their nests and burrows. The latter method is, however, impracticable where plants are growing. For the same reason digging the insects out is usually impracticable.

MOLINIA.

The principal species is a tall, hardy Grass (*ord.* Gramineæ) of tufted habit, and a fairly common British weed. It grows on bleak, sodden moors. The variegated form is cultivated as an edging plant. Propagation, by seeds, and division for the variegated form.

Principal Species and Variety :—

cœrulea, 1′ to 3′, hdy., British.
— variegata, variegated lvs.

MOLOPOSPERMUM (*syn.* Molospermum).

An elegant, Fern-like, hardy perennial (*ord.* Umbelliferæ), suitable for naturalising in the wilder parts of the garden. It may be increased by root division in spring, or by seeds, which should be sown as soon as ripe. Deep, rich soil is preferred, though not indispensable.

Only Species :—

cicutarium, 3′ to 5′, My., hdy., yel., wh., fruit yel., br.

MOLTKIA.

Elegant hardy or half-hardy herbaceous perennials (*ord.* Boragineæ). They may be propagated by cuttings in a cold frame, in sandy soil. The hardy species like a sunny, well-drained nook in the rockery, with sandy loam for soil.

Principal Species :—

cœrulea, 1′, Ap., hdy., bl., pur.
graminifolia (*see* Lithospermum graminifolium).
petræa, 6″ to 8″, Je., cool grh., pk., pur., deep bl. (*syns.* Lithospermum petræum of *Botanical Magazine* 5942, and Echium petræum).

MOLUCCELLA.

A small genus of hardy and half-hardy annuals (*ord.* Labiatæ), propagated by seeds, which should be sown in heat in spring and the plants put out in May. They thrive in a sandy loam. Lævis makes an excellent subject for skeletonising.

Principal Species :—

lævis, 1′ to 1½′, Aug., hdy., wh.
spinosa, hdy., wh. (*syn* Chasmonia incisa).

Moldavian Plum (*see Dracocephalum Moldavica*).

Molina (*of Ruiz and Pavon, see Baccharis*).
Mollia (*of Wildenow, see Polycarpæa*).
Molloya (*see Grevillea*).
Molucca (*see Moluccella*).
Moly (*see Allium Moly*).

MOMORDICA.

Annual and perennial stove climbing herbs (*ord.* Cucurbitaceæ), with white or yellow flowers and curiously shaped fruits. These Gourds are among the best for growing in warm houses, and the fruits are very ornamental when approaching ripeness. Momordicas may be raised from seed in the same way as other tropical Gourds (*see* GOURDS), and like a rich soil. They may be trained either to the rafters or pillars of the house or to wire trellises.

Principal Species :—

Balsamina, Je., flowers yel., fruits roundish, yel. Balsam Apple.
Charantia, Je., flowers yel., fruits oblong, yel., seeds red. Allied to Balsamina.
chinensis, larger fruits than Charantia, and silvery, otherwise similar.
cochinchinensis, Jy., flowers large, yel., fruits large, red, round or oval (*syn.* mixta of *Botanical Magazine* 5145, *see p.* 84).
involucrata, Jy., flowers yel., fruits sc., fleshy.

Other Species :—

Elaterium (correctly Ecballium Elaterium, *see* figure).
martinicensis, resembles Charantia, very quick-growing.
mixta (*see* cochinchinensis).
muricata, flowers yel., fruits golden yel., with blood red pulp and wh. seeds. Muricata of Willdenow is referred to Charantia, and muricata of Vell. to Echinocystis muricata by *Index Kewensis*.

MONANTHES.

A small genus (*ord.* Crassulaceæ) of perennial, tufted herbs, with purple or orange flowers of considerable beauty. They may be grown like the Crassulas.

Principal Species :—

atlantica, Ap., grh., yel. (*syn.* muralis of *Botanical Magazine* 5988).
muralis (*see* atlantica).

MONARDA. (HORSE MINT.)

A genus of showy, hardy border flowers (*ord.* Labiatæ), easily grown in any garden soil which is fertile and not too dry. They are propagated by division or by seeds in spring. The flowers are in clusters, produced principally at the tops of the stems. The leaves are generally fragrant.

Principal Species and Variety :—

didyma, 1½′, sum., sc. (*syn.* kalmiana). Oswego Tea, Bee Balm, Sweet Bergamot.
fistulosa, 2′ to 5′, sum., pur. (*syns.* affinis, longifolia, etc.). Wild Bergamot.
— mollis, 2′, sum., flesh to lil. (*syns.* mollis, Lindheimeri, etc.).

Other Species :—

bradburiana, 2′, Je., wh., pk.
citriodora, 2′, Je., ann., pk.
clinopodia, 2′, Je., wh. Basal Balm.
clinopodioides, 1′, Je., pur. (*syn.* aristata of *Botanical Magazine* 3526).
punctata, 2′, sum., wh., yel., pur. (*syn.* lutea).
russelliana, 3′, Jy., pur.

MONARDELLA.

Hardy annual or perennial herbs (*ord.* Labiatæ) with aromatic foliage. They resemble the Monardas in appearance, and succeed under the same conditions (*see* MONARDA). Propagation, by root division.

Principal Species :—

candicans, 1′, sum., ann., wh.
macrantha, aut., per., sc.; very fragrant foliage, rootstock creeping.

MONESES.

One species only (*ord.* Ericaceæ), a hardy, stoloniferous, perennial herb, almost or entirely destitute of stem. The solitary flowers are interesting and pretty. Propagation, by division, and the soil should be light and rich. The plants do not dislike a semi-shaded position.

Only Species :—

grandiflora, Je., hdy., wh. or pk. (*syns.* uniflora and Pyrola uniflora).

MOMORDICA ELATERIUM.

MONIMIA.

A small and obscure genus (*ord.* Monimiaceæ), whose members are not in cultivation in this country. The flowers are small, and not at all showy. The species are all natives of the Mascarene Islands.

MONKEY FLOWER (*see* MIMULUS).

MONKEY PUZZLE (*see* ARAUCARIA IMBRICATA).

MONNINA (*syn.* HEBEANDRA).

Greenhouse evergreen shrubs, small trees, or herbs (*ord.* Polygaleæ). There are many species, but none is of any special decorative value, and

Momordica (*of Poeppig and Endlicher, see Cyclanthera*).
Monachanthus (*see Catasetum*).
Monella (*see Cyrtanthus*).
Moneywort (*see Lysimachia Nummularia*).
Monilia fructigena (*see Rot of Fruit*).
Monizia (*see Thapsia*).
Monkey Bread (*see Adansonia*).
Monkey Nut (*see Arachis hypogæa*).
Monkey's Comb (*see Pithecoctenium*).
Monkey's Earring (*see Pithecolobium*).
Monk's Cowl Orchid (*see Pterygodium*).
Monk's Hood (*see Aconitum*).
Monk's Pepper Tree (*see Vitex Agnus-castus*).

MOMORDICA COCHINCHINENSIS (*see p.* 83).

they are very rare in cultivation. Propagation, by seeds and cuttings. Soil, equal parts of loam and leaf soil, or peat, with sand.

Principal Species :—

obtusifolia, 12′, Je., red., pur., shr.
xalapensis, bright bl., yel., shr.

MONOCHÆTUM.

Greenhouse shrubs and sub-shrubs (*ord.* Melastomaceæ) rather difficult to grow well. Cuttings under a hand-glass, in bottom heat, in spring, root quickly. Soil, two parts of fibrous peat, one part of leaf mould, and plenty of sand.

Principal Species and Variety :—

alpestre, bright red, 2″ across, lvs. and stems tinged red.
dicranantherum of *Botanical Magazine* (*see* hartwegianum).
hartwegianum, win., bright ro., in large leafy panicles (*syn.* dicranantherum of *Botanical Magazine* 5506).
humboldtianum, Oct. to Dec., red, pur.
lemoineanum, win., early spr., rich vio., ro.
sericeum, spr., mauve.
— multiflorum ; more free flowering.

Other Species :—

tenellum, Oct., rich pur.

MONOCHORIA.

Stove aquatic herbs (*ord.* Pontederiaceæ) of little horticultural merit, but thriving under the same cultural treatment as that accorded to Eichorneas. Very few of the species have been introduced.

Principal Species and Variety :—

hastæfolia, 2′, Jy., bl. (*syns.* hastata and Pontederia dilatata).
vaginalis, 2′, sum., bl.
— Korsakowii, 1′, sum., vio.; more showy than the type.

MONODORA.

Stove trees (*ord.* Anonaceæ). Propagation, by imported seeds. Soil, fibrous loam two parts, peat one part, with well-decayed manure and sand.

Principal Species :—

grandiflora, My., yel., spotted red, drooping, young lvs. glossy, ro., pur.
Myristica, 50′ to 60′, sum., yel., smaller than grandiflora.
tenuifolia, lvs. narrow.

MONOGRAMME. (Rush Ferns.)

Grass-like stove Ferns (*ord.* Filices), interesting because they are simpler in structure than any other Ferns, but of little value from a decorative point of view, although a few of them do well in warm Fern cases. They are increased by division of the rhizomes, and like a peaty medium to ramble in. In all cases the fronds are very narrow —from 1 line to 3 lines broad.

Principal Species :—

dareæcarpa, fronds 1″ long.
graminea, fronds 2″ long, rare (*syn.* linearis).
graminoides, fronds 1½″ long.
immersa, fronds 2″ to 3″ long (*syn.* Pleurogramme immersa).
Junghuhnii, fronds 6″ to 12″ long, very papery, the strongest grower of all the species.
rostrata, fronds 3″ to 4″ long.
seminuda, fronds 4″ to 8″ long (*syn.* Pleurogramme seminuda).
subfalcata, fronds 1″ long.
trichoidea, fronds 3″ to 4″ long.

MONOLENA.

Fleshy stove herbs (*ord.* Melastomaceæ), with thick rhizomes, and large, often showy, flowers. Very few of them are in cultivation, and probably primulæflora is the only species that has been introduced. Propagation, by cuttings of the rhizomes, started in a close frame with bottom heat, in spring. Soil, loam and peat, or leaf mould, in equal parts, with one-sixth sand.

Principal Species :—

primulæflora, 6″, Nov., st., bright pk., with yel. anthers and wh. eye, lvs. glossy grn., with pur. leaf stalks (*syn.* Bertolonia primulæflora of gardens).

MONOLOPIA.

Five species of hardy annual herbs (*ord.* Compositæ) with woolly leaves and stems, and yellow flowers. Propagation, by seeds sown in April. Any light soil.

Principal Species :—

major, 2′, Jy., yel., silvery wh., woolly foliage.

MONOMERIA.

Two species of epiphytal Orchids (*ord.* Orchidaceæ), probably lost to cultivation. They are more curious than pretty, the petals being abortive. Barbata is an Indian, and nitida a Mexican species.

MONOPYLE.

A small genus of stove herbs (*ord.* Gesneraceæ), allied to Gloxinia, and answering to the same treatment.

Principal Species :—

racemosa, Jy., wh., spotted br., lvs. with swollen petiole bases.

MONOTOCA.

Greenhouse evergreen shrubs or small trees (*ord.* Epacrideæ), with small white flowers. They are of little decorative value, but may be grown the same as the Epacrises.

Principal Species :—

elliptica, 8′, My., Aug. ; a small tree.
lineata, 6′, shr.
scoparia, 5′, My., Aug., shr.

MONSONIA.

Greenhouse herbs or sub-shrubs (*ord.* Geraniaceæ) of ornamental appearance. They may be increased by seeds sown in a gentle hotbed, in spring; also by cuttings in sandy soil, under a hand-light or cold frame, in autumn. Soil, sandy loam two parts, peat or leaf mould one part, and sand.

Principal Species :—

lobata, 1′, spr., sub-shr., bl., pur., red, wh., grn.
speciosa, 6″, spr., sub-shr., ro., with a pur. eye and grn. exterior.

MONSTERA (*syns.* Serangium and Tornelia).

A small genus of stove evergreen climbers (*ord.* Aroideæ). They take kindly to pot culture, but it is well that the pots should be stood in water, for the plants are very thirsty subjects. Stock may be increased by cutting up the succulent stems, and rooting the pieces in a close frame in Cocoanut fibre refuse. Soil, loam that has been stacked with cow manure, two parts, and leaf mould one part.

Principal Species :—

acuminata, leaf blades 8″ to 10″ long, one-sided (*syns.* tenuis and Marcgravia paradoxa of nurserymen's catalogues).
Shingle Plant.

Monobothrium (*see Swertia*).
Monochilus (*of Wallich, see Zeuxina*).
Monolophus (*see Kæmpferia*).
Monopanax (*see Oreopanax*).
Monoxora (*see Rhodamnia*).

deliciosa, flowers yel., fruits br., succulent, and of Pineapple flavour, lvs. large. A good subject for sub-tropical gardening (*syns.* Philodendron pertusum and Tornelia fragrans).
pertusa, My., flowers yel., wh. (*syn.* Adansonii).
tenuis (*see* acuminata).

MONTAÑOA (*syns.* ERIOCARPHA, ERIOCOMA, and MONTAGNÆA).

North American shrubs (*ord.* Compositæ), with heads of white, yellow, or pink flowers. Bipinnatifida is excellent for sub-tropical gardening, for which it is occasionally utilised. Increase, by

MORÆA EDULIS (*see p.* 87).

seeds sown in gentle bottom heat in spring, the seedlings being planted out about the beginning of June. Soil, good fibrous loam.

Principal Species :—

bipinnatifida, 6″ to 8″, sum., hlf-hdy., flowers yel., lvs. bipinnatifid (*syns.* heracleifolia, and Polymnia grandis).

Other Species :—

heracleifolia (*see* bipinnatifida).
mollissima, Aug., Oct., hlf-hdy. shr., yel., wh.
tomentosa, 3′, Sep., hlf-hdy., wh. (*syn.* Eriocoma fragrans).

MONTBRETIA.

Description.—A garden section of the genus Tritonia (*ord.* Irideæ). All the varieties are "bulbous" plants of great beauty, and of much value for late summer flowering.

Propagation.—By division, offsets being produced freely. These, when separated, should be planted in the reserve garden to form flowering plants at a later period. Seeds may be used for new varieties.

Soil.—Light loam of a sandy consistency, enriched with well-decayed stable manure.

Other Cultural Points.—In order to ensure a good supply of flowers it is imperative that the bulbs be planted in a position well exposed to the sun, and the soil must be thoroughly drained, as Montbretias, though requiring plenty of water during the growing season, dislike stagnant moisture. Planting should be done in autumn or early spring. Many seedling varieties of value have been raised during recent years, a selection of which is appended. (*See also* TRITONIA.)

Principal Varieties and Hybrids :—

Auricule, dark yel., pur. centre.
Aurore, 2′, or. (*syn.* aurea).
Bouquet Parfait, bright vermilion.
crocosmiæflora, 1½′ to 3′, sc.; hybrid (Crocosmia aurea × Tritonia Pottsii).
— flore pleno, deep or., yel.
Drap d'Or, large, rich yel.
Eldorado, 2′, gold yel.
elegans, bright yel., streaked vermilion.
Etoile de Feu, vermilion, deep yel. centre.
Fantaisie, large, bright vermilion, light yel. centre.
Feu d'Artifice, yel., vermilion.
Gerbe d'Or, vermilion, or.
Germania, yel.
Pottsii (*see* Tritonia).
Tigridie, or., yel., br. throat.

Other good varieties are Solfatare, Sulphurea, Talisman, and Transcendent.

MONTEZUMA.

A showy stove evergreen tree (*ord.* Malvaceæ), propagated by cuttings of firm shoots, in sand, in a close frame, with bottom heat. Soil, sandy loam and fibrous peat in equal parts.

Only Species :—

speciosissima, 30′, st., pur., sc., large.

MOOREA.

A single species of stove epiphytal Orchids (*ord.* Orchidaceæ), very rare, as yet, in cultivation. It is allied to Houlletia. Soil, fibrous peat and loam in equal parts, with a little sphagnum moss and sand. A rest must be given after growth is completed.

Only Species :—

irrorata, pseudo-bulbs 2″ to 4″ high, lvs. 1¼′ to 2′ long, sum., intermediate house, reddish br., lip yel., dark pur.

MOQUILEA.

None of the species of Moquilea (*ord.* Rosaceæ) is of any decorative value, and they are only cultivated as curiosities. Utilis, the Caraipi or Pottery Tree of Para, has economic properties that render it of importance abroad. Its bark, powdered, and mixed with an equal quantity of clay, is used for making various articles of pottery for domestic use. The ware is tough, and will stand a great degree of heat.

MORÆA.

Iris-like plants (*ord.* Irideæ), with prettily coloured flowers, suitable for greenhouse or conservatory work. According to Mr. Baker, this

Monterey Pine (*see Pinus insignis*).
Monthly Rose (*see Rosa indica*).
Moon Creeper (*see Ipomœa Bona-Nox*).
Moon Daisy (*see Chrysanthemum Leucanthemum*).
Moon Flower (*see Ipomœa*).
Moon Seed (*see Menispermum*).
Moon Trefoil (*see Medicago arborea*).
Moonwort (*see Botrychium*).

genus includes Helixyra, Dietes, and Vieusseuxia. They like a rather sandy loam, and should be grown in a glass structure from which frost is excluded in winter.

Principal Species :—

bicolor, 2′, sum., yel., br.
edulis, 4′, My., vio. (*see p.* 86).
robinsoniana, 6′, Je., wh. (*syn.* Iris robinsoniana). Wedding Flower.
spathacea, 1′, Mch., yel. (*syn.* Dietes Huttoni).
tricuspis, 1′, My., wh., pur. spots (*syn.* Vieusseuxia tricuspis).
unguiculata, 1′, Je., wh., red spots (*syn.* Vieusseuxia unguicularis).

Other Species and Varieties :—

angusta, 9″, My., lil.
ciliata, 6″, Sep., yel. or lil.
— barbigera, red, yel. (*syns.* barbigera and tricolor).
crispa, 6″, My., Je., bl. (*syns.* decussata and Iris crispa).
fimbriata, 6″, Je., lil. (*syn.* Vieusseuxia crispa).
glaucopis, 2′, My., wh., blk. spot (*syns.* Iris Pavonia of *Botanical Magazine* 168, and Vieusseuxia glaucopis).
iridoides, 6″, Jy., wh., br. or yel. spots.
papilionacea, 6″, My., red., bl.
Pavonia, 2′, My., red, blk. spot (*syn.* Iris Pavonia).
— lutea, yel.
— villosa, pur.
ramosa, 2′, My., yel. (*syn.* bulbifera).
Sisyrinchium (correctly Iris Sisyrinchium), sulphur yel.
tripetala, 1′, Je., bl. (*syn.* Vieusseuxia tripetaloides).
viscaria bituminosa, 1′, My., yel.

MOREL.

A common name used for Fungi of the genus Morchella. Several species are edible, and are used in a somewhat similar manner to Truffles. They are usually distinguishable by means of the stout stem, and globular, oval, or cone-shaped head, which is very much wrinkled. In the depressions of the head, small bladders, containing eight spores, are found. The several species show a great variation in height, some being but 1″ or 2″ while others are upwards of 1′. The commonest and most useful is esculenta, which grows 2″ or 3″ in height and is the same distance across the head. In colour it varies from grey to yellow. It is collected largely in Germany and Kashmir, dried, and sold for flavouring soups, gravies, etc. When fresh, it is often used stuffed with minced meat. Morels should be collected when dry.

MORINA.

Hardy or half-hardy perennial herbs (*ord.* Dipsaceæ), which are distinguished by their spiny, Thistle-like leaves, and crowded whorls of pink or yellow, tubular, irregular flowers. They succeed in a light, warm soil, sheltered from cold winds. Propagation, by means of seeds sown indoors in early spring, or by division of the rootstocks after flowering. When the latter method is adopted, some shade should be given for a week or two if the weather is hot.

Principal Species :—

betonicoides, 1′ to 1½′, Je., hdy., ro. red.
coulteriana, 1′ to 1½′, Je., yel.
longifolia, 2′ to 3′, Jy., pur.
persica, 2′, Jy., hlf-hdy., red, wh. (*syn.* wallichiana).

Morchella (*see Morel*).
Morenia (*see Chamædorea*).
Moreton Bay Chestnut (*see Castanospermum*).
Moreton Bay Pine (*see Araucaria Cunninghamii*)
Moryagnia (*see Simethis*).

MORINDA.

A large genus (*ord.* Rubiaceæ) composed of trees, shrubs, or woody climbers, whose chief characteristics are whorled or opposite leaves with united stipules, dense flower heads borne in the axils of the leaves, and fleshy berries, the latter giving rise to the common name of Indian Mulberry. They may be grown in sandy loam in a tropical house, bnt are of little horticultural value. From the root and bark of several species a dye is extracted.

Principal Species :—

angustifolia, 6′, My., wh.
citrifolia, 15′, My., wh.
jasminoides, Ap., pale yel., fruits or.

MORINGA.

Tropical trees (*ord.* Moringeæ), usually with pinnate leaves and loose panicles of yellow flowers borne in the leaf axils. Pterygosperma is known as the "Horseradish Tree," on account of its fleshy roots being very similar to, and used in the same manner as, Horseradish. Propagated by cuttings of half-ripe shoots in sandy soil in a warm case in summer. Soil, fibrous loam, peat, or leaf mould, with sand.

Principal Species :—

aptera, 20′, sum., pale yel.
concanensis, 15′, sum., yel.
pterygosperma, 20′, sum., pale yel. (correctly oleifera).

MORISIA.

The only species known of this genus (*ord.* Cruciferæ) is hypogæa, a charming little hardy rock plant. It is a low-growing perennial, spreading horizontally into a small, carpet-like mass, rarely more than 2″ or 3″ high. The foliage is very dense, and the leaves are 2″ or 3″ long and deeply cut. The flowers are numerous, yellow, and borne in early summer. Increased by seeds sown out of doors, by root cuttings or by division. Soil, sandy loam, in a light position.

MORISONIA.

A tropical genus of evergreen trees (*ord.* Capparideæ), with oblong leaves, whitish flowers, and round, often brightly coloured, berries. Propagated by cuttings in a close case.

Principal Species :—

americana, 15′, sum., wh.
Imrayi, 12′ to 20′, sum., wh.
multiflora, 15′ to 20′, sum., wh.

MORMODES.

Description.—Epiphytal Orchids (*ord.* Orchidaceæ), closely resembling Catasetum, the chief point of difference being found in the column of the flower. The species are deciduous, and make rather long, stem-like pseudo-bulbs, which produce about six plaited, lance-shaped leaves. The flowers are thick and fleshy, and borne in dense spikes on thick stalks from side buds on the pseudo-bulbs.

Propagation.—Division of the plants at the time when growth commences. Stocks are, however, usually added to by imported plants.

Soil.—Fibrous peat and sphagnum.

Other Cultural Points.—Repotting should be performed in spring. Pots or Orchid baskets may be used with equal success, providing the drainage is perfect. They should be half-filled with broken crocks and charcoal, the plants placed on the crocks, and filled in lightly with peat fibre and small tufts of sphagnum. When completed, the

surface should form a mound with the plant in the centre. When growing rapidly, and the pots are well filled with roots, occasional applications of weak cow manure and soot water are beneficial. They rejoice in a light position in the warmest house when making their growth, but as soon as the leaves begin to show signs of decay a cooler and more airy position should be provided to thoroughly ripen the growths. Thrips form the worst insect pest, and must be kept under by light fumigations. If green or black fly appear on the young shoots in early spring a light fumigating should be given at once.

MORMODES LUXATA.

Principal Species and Varieties :—

Buccinator, 1′ to 1½′, Ap., reddish br., with darker spots.
— aurea, or. yel.
luxata, 1′ to 1½′, Jy., pale yel., with deep yel. lip streaked with br. (*see* figure).
— eburnea, ivory wh., very fine.
pardina, 1′, Jy., yel., crim. spots.
rolfeana, 1′ to 1½′, Jy., grn., br., fragrant.

Other Species and Variety :—

Cogniauxii, 1′, Je. (near rolfeana).
ignea, 2′, Jan., red, pur.,
— maculata, yel., br., spotted pur.

MORONOBEA.

A small genus of stove evergreen trees (*ord.* Guttiferæ), growing to a height of 30′ or 40′. They are of little service horticulturally. Cuttings of half-ripe wood root in a close, warm case, and sandy loam suits their requirements.

Principal Species :—

grandiflora, 40′.
riparia, 30′.

Morna (*see Waitzia*).
Morning Glory (*see Ipomœa*).

MORUS.

Trees or shrubs, for the most part hardy, form this genus (*ord.* Urticaceæ). The most common species is nigra, popularly called the Mulberry. This is well known by reason of its large, dark red, Raspberry-like fruits (*see* MULBERRY). The White Mulberry, M. alba, though of little service as a fruit, is useful from the leaves being largely utilised for feeding silkworms. The flowers of all the species are inconspicuous.

Principal Species :—

alba, 30′, My., grn., wh. Numerous vars.; Colombassa, Gasparini, heterophylla, italica, laciniata, latifolia, macrophylla, pendula, and rosea, are the best known.
nigra, 30′, Je., grn., wh., fruit ripe in Sep., red or blk.
rubra, 70′, Jy., grn., yel., fruit ripe in Sep., red.

MOSCHARIA.

One species—M. pinnatifida, a hardy annual (*ord.* Compositæ), grows about 6″ high, and bears white flower heads in loose panicles. Seeds may be sown indoors and planted out in May. The plant has a musky odour.

MOSCHOSMA.

Riparium (*ord.* Labiatæ), a recently introduced plant, is a greenhouse perennial, growing 3′ high, with soft wood, opposite, Nettle-like leaves, and large terminal inflorescences of whitish flowers with purple anthers. It roots readily from cuttings of young shoots, and requires exactly the same treatment as is given to Salvias. December and January are the two months when it may be expected to make the conservatory gay (*see p.* 89).

MOSSES.

Description.—Flowerless plants, ranking below such vascular cryptogams as Ferns, Selaginellas, Lycopods, and a few other flowerless groups, and, like them, characterised by an alternation of generations—a sexual and a non-sexual. They belong to the class Muscineæ and the series Musci, which again are divided into four orders—Bryaceæ, Phascaceæ, Andreæaceæ, and Sphagnaceæ. The first, or sexual, generation is a leafy plant, either creeping or erect, branching or simple, familiarly known as "Moss," and bearing the sexual organs. The spore-bearing generation is leafless, and corresponds to the leafy generation of the Fern.

Life History.—When the spore of a Moss germinates, it develops a branching, thread-like body, the protonema, from different cells of which arise leafy buds, the nascent stems. These, when fully developed, at certain seasons give rise to antheridia and archegonia, the male and female organs respectively. The antheridia are more or less cylindrical sacs filled with a tissue which ultimately becomes the mother-cells of the antherozoids, and at maturity a single antherozoid is liberated from each mother-cell, and swims freely about in moisture by means of cilia. The archegonium is a bottle-shaped structure with a central cell (the oosphere), which is fertilised when an antherozoid reaches it. The result is an embryo which develops into the spore-bearing generation. The antheridia and archegonia are usually surrounded by bud-like structures of modified leaves known as the perichætium, and are either axillary or terminate the stem or branches. Both antheridia and archegonia may occur in the same bud when the Moss is bisexual. If in different buds, the Moss may be monœcious or dioœcious according as the sexes are on the same or different plants. The second

Photo: Cassell & Company, Ltd.

MOSCHOSMA RIPARIUM (*see p.* 88).

generation develops from the embryo, which lives parasitically on the mother plant, giving rise to a stalk (seta), bearing at its apex a theca, or capsule, filled with spores and crowned with a calyptra or cap (the remains of the ruptured archegonium). The capsule opens by a lid (operculum), while the opening is surrounded by a single or double row of teeth (peristome), either four or some multiple of it, according to the species. At maturity the spores are liberated, and repeat the life history of the Moss plant. There are no true roots, but their functions are performed by root hairs.

Propagation.—By spores, and vegetatively from almost any part of the plant by gemmæ, bulbils, etc.

Soil.—This varies greatly according to the habit of the species, some living on ordinary garden soil if moist or shaded. Others prefer peat, peat bogs, shady walks, and the crevices of stone or brick walls, or they may cover stones, or the base of tree trunks if continually moist.

Classification.—The Bryaceæ agree pretty closely with the above life-history, and are tufted or creeping plants. The Phascaceæ are small Mosses, the spores of which are liberated only by the decay of the capsule. The Andreæaceæ are tufted Mountain Mosses, without a stalk to the capsule, which splits into four valves from the base upwards. The Sphagnaceæ, or Bog Mosses, have large, colourless, empty cells between the green ones, capable of absorbing and retaining moisture. The antheridia and capsule are globose, the latter having no peristome.

Uses.—The species of Sphagnum, or Bog Mosses, are all important to the Orchid grower, as they either form an ingredient in the compost used for potting or basketing a great number of species, or may be used alone in pots, baskets, or on rafts for certain other species. Members of the Bryaceæ are often used as packing for plants to be sent by post or rail, species of Hypnum being very useful for the purpose. Some of the latter are often dried, dyed, and used for various decorative purposes. Cut flowers and even vegetables are sometimes bedded in Moss at exhibitions. The surface of pots containing plants are sometimes covered with tufts or sods of Dicranium and other Mosses. Polytrichum commune, or common Hair Moss, when growing luxuriantly in wet, boggy places, is sometimes gathered and made into fine brooms.

Moss on Lawns.—When soil becomes very much exhausted or impoverished, or is too constantly moist or shaded, the grass on lawns is liable to die out in patches, its place being taken by Mosses. To remedy this, attention should be given to drainage, and to the reduction of shade from trees, if possible. During the winter months the surface may be raked at intervals, to loosen and break up the Moss. Top-dress the surface with some rich compost, such as soil mixed with well-rotted farmyard manure. Dressings of soot and nitrate of soda may also be given when the weather is open. If a healthy growth of the grass is encouraged in this way the Moss will disappear.

Moss on Walks.—Walks made of certain gravels are liable to become green with a coating of fine Mosses; but in moist, shady situations, especially under the drip of trees, any gravel will become green. A top-dressing of common salt in dry weather will destroy the Mosses. A strong solution of sulphate of copper (blue vitriol) will answer the same purpose. Weed killers obtainable from the dealers are also very effective.

Moss on Trees.—Fruit trees may be kept clear of Mosses, Lichens, and insects by scrubbing them annually or biennially with a solution of common salt. A solution of chloride of lime has also been used very effectively. A common practice is to limewash the trunks of fruit trees, and thus destroy the Moss. The soda-potash solution (*see* INSECTICIDES) should also be used.

Moss, Spanish (*see Tillandsia usneoides*).
Moss Campion (*see Silene acaulis*).
Moss Rose (*see Rosa centifolia muscosa*).
Mossy Cupped Oak (*see Quercus Cerris*).

MOTHS.

These are insects (Heterocera) forming a section of the order Lepidoptera, and distinguished by their wings being covered with overlapping scales. The colour resides in the scales. Moths may be distinguished from butterflies (Rhopalocera) by their horns or antennæ being variable in shape, often beautifully feathered, but never clubbed at the end, as butterflies' always are. Butterflies always fly by day; most of the moths fly by night, but a few by day, or day and night. Contrary to popular notions, some of them are beautifully coloured, including the Tiger Moths (Arctia), some of the Hawk Moths (Smerinthus), Underwing Moths (Triphæna), Gooseberry Moth (Abraxas), the Cinnabar Moth (Callimorpha), and various others. The females of some are wingless, as in the Mottled Umber (Hybernia defoliaria), Pale Brindled Beauty (Phigalia pilosaria), and Small Brindled Beauty (Nyssia hispidaria); or have only rudimentary wings in the Winter Moth (Cheimatobia brumata) and Scarce Umber (Hybernia aurantiaria).

All moths pass through four stages—namely, the egg, caterpillar or larva, pupa or chrysalis, and imago or perfect state. They grow only in the caterpillar stage, during which time they are voracious feeders according to their size, and are classed as injurious when they feed upon cultivated crops, the amount of injury they cause being proportionate to their size and numbers. Certain of them may do great damage in one or more districts, yet be absent from others; while some may suddenly become a plague for a year or two and then disappear more or less completely, the cause not always being definite. They are practically harmless in all other stages of their life.

The pupa stage is quiescent, being without legs or wings, the hardened pupa case being enclosed in a silken cocoon suspended from some object, hidden in their burrows in trees or shrubs, or buried in an earthen cocoon in the ground, according to the species. The pupa is the stage, in fact, when the imago or perfect state is being developed.

There are close upon, if not quite, 2,000 British moths, the larger ones being termed the Macrolepidoptera; the small ones (by far the more numerous) the Microlepidoptera. For convenience, the whole of them are classified into nine groups as follows:—

1. Sphingina, including the Sphinges or Hawk Moths. They may be distinguished by having their antennæ thickest in the middle and tapering to each end, whereas in all others these organs are thickest at the base. The Death's Head (Acherontia Atropos) feeds on Potatoes, but, though

Moth Mullein (*see Verbascum Blattaria*).
Moth Orchid (*see Phalænopsis*).

widespread, is not numerous. The Humming Bird Hawk Moth (Macroglossa stellatarum) and the Clearwing Moths (Trochilium) also belong here.

2. Bombycina include the Goat Moth (Cossus ligniperda), Wood Leopard (Zeuzera Æsculi), the Tiger Moths (Arctia), Ghost Moth (Hepialis Humuli), Vapourer Moth (Orgyia antiqua), the Lackey (Clisiocampa neustria), and many others which are highly injurious to cultivated plants. The Goat and Wood Leopard Moths are notable for boring into the trunks of fruit and other trees. The group is distinguished by the perfect insect having a short, thick body, blunt behind, and broad wings.

3. Noctuæ or Night-Flying Moths have a rather thick body, pointed behind, and narrower wings in proportion to their length. There are about 300 of them, including the Yellow Underwing (Triphæna pronuba), Silver Y (Plusia Gamma), the Heart and Dart Moths (Agrotis), Cabbage Moth (Mamestra Brassicæ), and many others, which prove highly injurious to garden and field crops. The caterpillars of many hide away underground.

4. Geometrina are slender-bodied moths with broad wings, and their caterpillars are known as loopers from their mode of walking, by looping up the body. This is due to their having only ten instead of sixteen legs. There are about 260 British species, including several injurious to fruit trees, such as Phigalia and Nyssia; while the V Moth (Halia vauaria) destroys the leaves of Currants and Gooseberries. Even more injurious are the Gooseberry Moth (Abraxas grossulariata) and the Winter Moth (Cheimatobia brumata).

5. Pyralidina are slender-bodied moths, with long and triangular wings. The species are moderately numerous, but few of them ever give trouble in the garden. They include the Grass Moths, Knot-horns, Veneers, etc.

6. Tortricina have short and broad wings, straight on the hinder edge, but suddenly convex on the front edge or costa, near the base. When the wings are folded they have the outline of a bell; hence the meaning of the term "bell moths" sometimes applied to them. They are small, numerous in species, and include many that are injurious, such as the Grape Moth (Ditula angustiorana), several on Roses, the Wœberian Tortrix (Semasia wœberiana) in the bark of Apple and other fruit trees, the Codlin Moth (Carpocapsa pomonella), and the Red Grub of Plum (Carpocapsa funebrana).

7. Tineina are small moths, often no bigger than flies, and may generally be recognised by their narrow wings with long fringes on the hinder edges of both pairs. They are very numerous in species, and sometimes in individuals. They include the Clothes Moth, Long Horns, and Flat Body Moths (Depressaria).

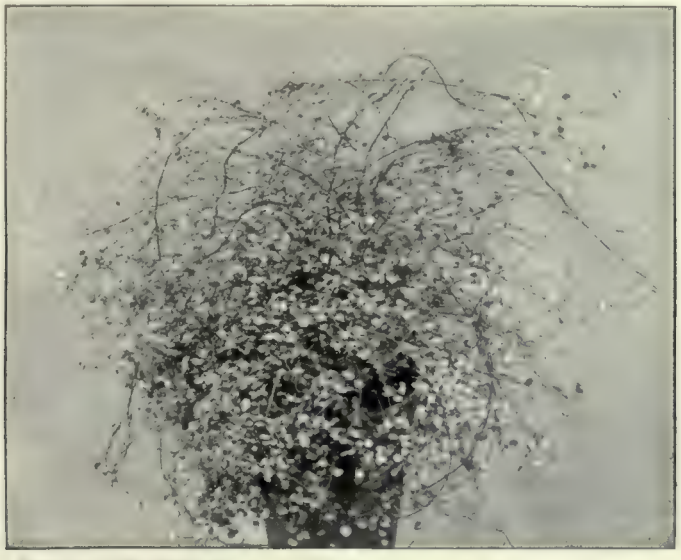


Photo: D. S. Fish, Edinburgh.

MUEHLENBECKIA COMPLEXA (*see p.* 92).

8. Pterophorina consist of twenty-nine species of Plume Moths, recognised by the two-lobed fore wings and three-lobed hind wings. They are not injurious.

9. Alucitina contain only one British species, the Twenty Plume Moth, each of the four wings having six feathers, or twenty-four in all.

Remedies for the attacks of various enemies mentioned here will be found under the crops they infest, and under INSECTICIDES.

MOULD.

The name is given to a great number of Fungi, owing perhaps to their microscopic size and the impossibility of distinguishing them by the naked eye. There is a considerable amount of vagueness as to what is intended by the term, beyond the fact

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Mother of Thousands (*see Hen and Chickens, Linaria Cymbalaria, and Saxifraga sarmentosa*).

Motherwort (*see Leonotis*).

Mouffetta (*see Patrinia*).

that the fungi are filamentous, and discernible by the unaided eye only when aggregated in masses forming a felt or covering to the object attacked, or when making fluids, in which they are living, cloudy. Certain of them have the power of setting up fermentation in fluids containing sufficient nutriment for them.

Attempts have been made to classify them according as they are white (Mucedines) or dark (Dematiei), but as their life histories are often complicated, and themselves diverse in structure, as well as habit, no good purpose can be served by such general classifications. Many of them have been proved to be only the early stages of more highly developed or complicated organisms. A general idea of their nature may be gleaned by taking a few of them as examples. The Common White Mould (Mucor Mucedo) hastens the decay of fruit, but seems only capable of this when the skin has been broken, and especially if the fruit is damp or under damp conditions. This mould is practically a saprophyte; that is, one that lives on a dead host. The Blue Mould of jam and various articles of food is Penicillium glaucum, belonging to a much higher section. It also is a saprophyte whose well-being is promoted by dampness, and may thus to a considerable extent be prevented.

Quite different in character are the moulds that attack living plants and destroy them, such as Phytophthora infestans, or Potato disease, which also attacks Tomatoes, reducing their stems and leaves to putrefaction. Here, again, moisture is the agent that enables them to prove so destructive. Many species of Peronospora are also highly injurious to certain cultivated plants, but as they penetrate into the interior of the tissue there is no real remedy for them. By good cultivation and avoiding the causes that favour them, their rapid increase will be prevented.

MOUNTAIN ASH (*see* PYRUS AUCUPARIA).

MOWING.

A very necessary operation where lawns are well kept. Formerly mowing was done with scythes, and to cut the grass evenly without showing the marks of the scythe was considered to be one of the great tests of a young gardener's ability. Now, however, machines which mow, roll, and, if desired, collect the cut grass, are universally used for lawns. When mowing with a scythe, the work is best done when the grass is wet, with a machine when the grass is dry, or nearly so. If the grass is not very long, it is advisable to take the collecting box off; the cut grass is then scattered broadcast, and in addition to acting as a manure adds elasticity to the turf. As a rule, lawns should be mown weekly in wet, and fortnightly in dry, weather.

MUCUNA.

Strong-growing woody climbers, suitable for a stove or intermediate house (*ord.* Leguminosæ). As a rule, they are shy flowerers, and are rarely seen in cultivation. Increased by cuttings of half ripe wood. They grow well in a mixture of fibrous peat, loam, and coarse sand. A bright, sunny position is a great aid to success.

Principal Species :—

atropurpurea, 10′, sum., pur.
macrobotrys, 40′ to 60′, yel.
pruriens, 12′, sum., pur. Cow Itch.
sempervirens, 12′.

MUEHLENBECKIA.

Hardy or half-hardy, shrubby or climbing plants (*ord.* Polygonaceæ) of value for large rockeries. All root readily from cuttings, and succeed in sandy loam.

Principal Species :—

adpressa, hlf-hdy., long, weak branches.
complexa, hdy., long, weak branches (*see p.* 91).
nana, a good garden plant for small rockeries.
platyclada, 4′, grh. shr.
sagittifolia, strong cl.
varians, hlf-hdy., long, weak branches, small lvs. (*syn.* varium).

MULBERRY.

The Mulberry (Morus nigra) (*see p.* 93) has been in cultivation from a distant period on account of the use of its leaves as a food for the silkworm, and also for its fruits, which have been used for making wine, as well as for dessert. Their sub-acid flavour when ripe is grateful to many. M. alba is now used for feeding silkworms.

The Mulberry is hardy in Great Britain and Ireland, but its fruits will not ripen in the colder districts without the shelter of a wall. Almost any good garden soil is suitable, but it should be one of considerable depth, and not too dry. The propagation of the Mulberry is by means of layers in November or February, and by cuttings of the young wood, with a piece of the older attached, in autumn or spring. These may be about 1′ or 2′ long, and ought to be planted deeply in autumn or spring in a shady border. Seeds are also sown in the open in May, or under glass a month or two earlier. Inarching is also practised.

Pruning of trees on walls or fences is performed by thinning out or stopping the stronger-growing shoots in summer. Others may be thinned out where too thickly crowded. The fruit is produced on both spurs and short-jointed wood of the current year's growth.

MULCHING.

It may safely be said that great benefit to gardens would result were the practice of mulching more generally followed, especially by amateurs, who are often slow to avail themselves of its help. It consists in placing some material on the surface

Mountain Avens (*see Dryas octopetala*).
Mountain Damson (*see Simarouba amara*).
Mountain Ebony (*see Bauhinia*).
Mountain Green or Pride (*see Spathelia simplex*).
Mountain Holly (*see Nemopanthes*).
Mountain Mint (*see Pycnanthemum*).
Mountain Parsley Fern (*see Cryptogramme*).
Mountain Plum (*see Ximenia americana*).
Mountain Tobacco (*see Arnica montana*).
Mournful Widow (*see Scabiosa atropurpurea*).
Mouse-ear Chickweed (*see Cerastium*).
Moussonia (*see Isoloma*).
Moustache Plant (*see Caryopteris Mastacanthus*).
Mowing Machines (*see Lawn Mowers*).

Muhlenbergia Baxteri (*see Oxylobium scandens*).
Mucedines (*see Mould*).
Mudar Plant (*see Calotropis gigantea*).
Mud Plantain (*see Heteranthera reniformis*).
Mugwort (*see Artemisia vulgaris*).
Mukia (*see Melothria*).
Mulberry, Indian (*see Morinda*).

of the soil, either to prevent evaporation in dry weather, or to give an additional supply of nutriment to the roots of the plants. Mulching is also useful to prevent frost from destroying the more tender plants.

To prevent evaporation, and so to lessen the amount of watering required, which is a great gain compared to flooding the warm soil with water at a low temperature, a mulch of some loose material is preferable. Where appearance is not a consideration, this may consist of loose straw or other litter, but where that has to be considered, as in the case of flower-beds, Cocoanut fibre refuse, spent tan, chaff, or even moss-litter may be applied. The soil should be soaked previous to applying this mulch

Where the object is to supply additional nourishment, mulching with well-decayed manure or with fresh soil with the addition of some good artificial manure (*see* ARTIFICIAL MANURE) can be practised,

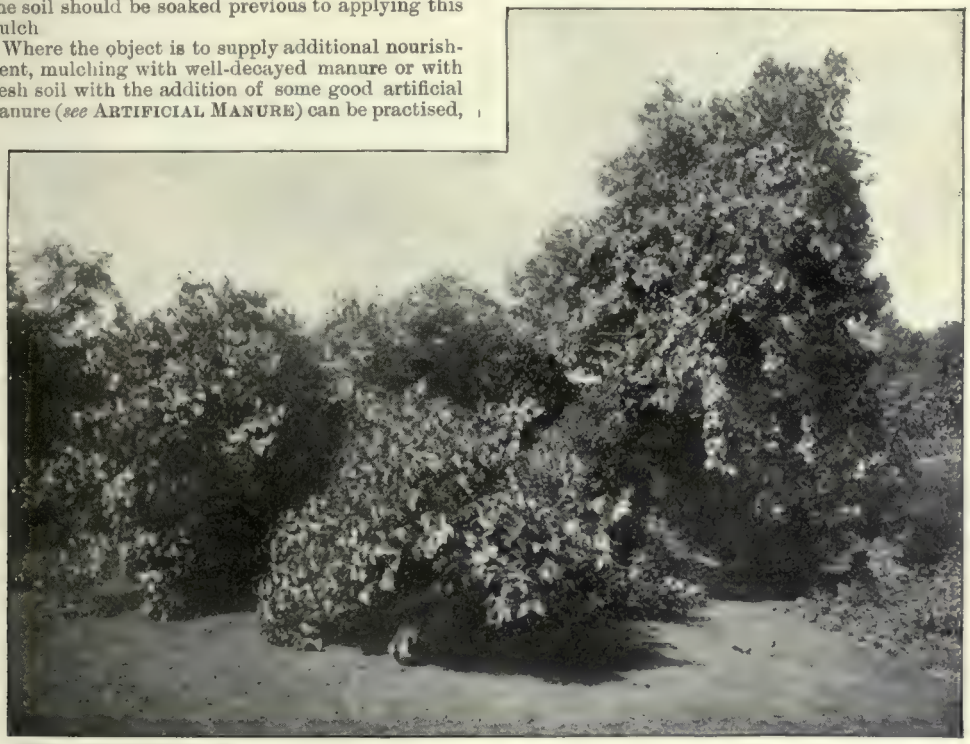


Photo: Cassell & Company, Ltd.

A FINE MULBERRY GROWING IN THE GARDEN AT SION LODGE, ISLEWORTH.

and the plants watered through this in dry weather. A slight mulching or top-dressing with fresh soil is also beneficial to many herbaceous or Alpine flowers in autumn and spring. This may consist of loam, leaf mould, sand, or broken granite. As a winter protection ashes are sometimes applied as a mulch, but those produced from some kinds of coal are injurious, and straw, Cocoanut fibre refuse, or other loose material is to be preferred.

MUNDTIA.

One species only of this shrubby genus (*ord.* Polygaleæ) is in cultivation. It requires greenhouse culture, and makes a spiny, stiff-growing bush. Cuttings of young shoots may be rooted in early summer if placed in sandy soil in a close case. Soil, sandy peat.

Only Species :—

Desertorum (*see* Muraltia juniperifolia). spinosa, 2′ to 3′, spr., wh.

MUNTINGIA.

Tropical trees and shrubs (*ord.* Tiliaceæ) of little horticultural value, though one species, calabura, has pretty white flowers. The treatment usually accorded a general collection of stove plants suffices.

Principal Species :—

calabura, 25′, Je., wh.

MURALTIA.

A large genus (*ord.* Polygaleæ) of shrubs or subshrubs, of little use to the horticulturist. They are usually of bushy habit, with small, ridged leaves and reddish or purple flowers. Cuttings root readily in sandy peat.

Principal Species :—

Heisteria, 3′ to 6′, Jan., pur. juniperifolia, 3 , Je., pur.

MURRAYA.

Stove evergreen shrubs (*ord.* Rutaceæ), with pretty, glossy leaves, and white, Orange-like blossoms. A few species only are known. Cuttings of half ripe wood root quickly in sandy soil in

Mulgedium (*see Lactuca*).
Mullein (*see Verbascum*).

Mundi Root (*see Chlorocodon*).
Murrain Berries (*see Tamus communis*).

a warm propagating case. Soil, fibrous peat and loam.

Principal Species :—

exotica, 10′, Aug., wh. Kœnigii, 40′, Je., yel.

MUSA.

Description.—A genus of herbaceous tropical plants (*ord.* Musaceæ) of noble appearance, requiring a stove temperature. Though apparently possessing stems, the plants are really stemless, for the pseudo-stem is built of the sheathing bases of the leaf stalks. This pseudo-stem may attain a height of twenty or more feet, and have leaves of a corresponding size. In the tropics Musas are grown for the fruits, chiefly those of sapientum and its variety paradisiaca, the Banana and Plantain, while textilis is the source of Manilla Hemp. In Great Britain the plants have hitherto been grown chiefly for ornamental purposes; but, given plenty of room and fairly large houses, Bananas of excellent quality may be produced with little trouble. Musas may also be used with good results in the subtropical garden, provided that shelter from strong winds be afforded; without this the long leaves soon present a sorry, torn aspect. Ensete has previously been considered to be the hardiest species, but now this has to give place to Basjoo (*syn.* japonica of gardens), which has proved to be hardy in the more favoured parts of the south-west of England.

Propagation.—By suckers, which are produced after the stem has flowered or been cut down.

Soil.—Rich, fairly retentive loam, and well-decayed manure.

Other Cultural Points.—Musas can hardly have too rich a rooting medium, and water must be given in quantity at all times. They may be grown in large pots in the stove, but do infinitely better when planted out. Constant feeding must be accorded to pot plants, with frequent syringing. Careful handling is requisite, as the leaves easily bruise.

Principal Species and Varieties :—

aurantiaca, or., yel., fruit grn., stem short, close to sanguinea.
Bakeri, bracts crim.
Cavendishii, 5′ to 7′, grh. (*syn.* sinensis).
discolor, grn., bracts red, fruit reddish vio., very good.
Ensete, 13′ to 25′, red midrib; good for bedding.
sapientum, 20′ to 25′, lvs. 10′. True Banana.
— paradisiaca, fruit shorter. Plantain.

Other Species and Hybrid :—

assamica, dwarf, suitable for pots.
Basjoo, nearly hdy., fruit 3″ long, not edible (*syn.* japonica of gardens).
Fehi, 15′ to 20′, fruit very fine.
kewensis, stem 3′, Je. to Oct., bracts crim., hybrid (Mannii × rosacea).
sinensis (*see* Cavendishii).

MUSCARI.

Description.—Pretty, hardy bulbous plants (*ord.* Liliaceæ), of great beauty when grown in clumps or masses in the mixed border, rockery, or among grass. They also make pretty pot plants for a cool house. They have clustered spikes of small flowers. Muscaris may be purchased from bulb dealers and planted in early autumn.

Murucuja (*see Passiflora*).
Muscadine (*see Vitis vulpina*).
Muscaria (*see Saxifraga*).

Propagation.—By offsets, which are freely produced, and by seed.

Soil.—Any common soil.

Principal Species and Varieties :—

botryoides, 6″, Ap., bl.; pretty vars. are album and album grandiflorum, wh.; pallidum and pallidum grandiflorum, pale bl.; and carneum, pale flesh. Common Grape Hyacinth.
comosum, 9″, Ap., bl. Tasselled Hyacinth.
— album, scarce, wh.
— monstrosum, 9″, Ap., bl.; very pretty. Feather Hyacinth.
conicum Heavenly Blue, 9″, Ap., bl.; very fine.
Heldreichii, 9″, Ap., bl.; the earliest.
moschatum, 9″, Ap., bl., yel., shy bloomer in many gardens. Musk Hyacinth.
— flavum, yel.
racemosum, 6″, Ap., dark bl. (*syn.* Strangwaysii of Tenore, not Kotschy). Starch Hyacinth.
— carneum, pk.

Other Species :—

Argæi, 6″, Ap., bl.
armeniacum, 6″, Ap., bl.
atlanticum, 6″, Ap., deep bl.
azureum (*see* Hyacinthus azureus).
ciliatum (now Hyacinthus ciliatus).
commutatum, 6″, Ap., bl. (*syn.* Strangwaysii of Kotschy, not Tenore).
compactum, 6″, Ap., bl.
concinnum, 6″, Ap., bl., wh.
dilutum, 1′, Ap., bl.
Elwesii, 6″, Ap., bl.
græcum, 6″, Ap., bl.
grandifolium, 8″, Ap., bl.
latifolium, 9″, Ap., bl.
lingulatum, 6″, Ap., pale bl.
maweanum, 6″, Ap., bl.
micranthum, 6″, Ap., vio. bl.
neglectum, 6″, Ap., dark bl.
pallens, 6″, My., pale bl.
paradoxum, 9″, Ap., dark bl.
parviflorum, 6″, Ap., bl.
Pinardii, 6″, Ap., bl.
polyanthum, 9″, Ap., bl.
suaveolens, 6″, Ap., bl.
szovitzianum, 4″, Ap., pale bl.
transsylvanicum, 9″, Ap., bl.

MUSHROOMS.

Definition of the Term.—In its widest sense, "Mushroom" may be made to include all the Fungi belonging to the Hymenomycetes, but generally it is more or less restricted to those which resemble the common Mushroom in form. Popularly, all those which are edible and useful to man as food are included, while the poisonous ones are spoken of as Toadstools. There are, however, edible species of Fungi which have no resemblance to the common Mushroom, whereas the poisonous ones, or Toadstools, may and do often belong to the same genus as the edible Mushrooms. Thus, while the latter term may be employed to indicate certain kinds, it is necessary to become perfectly familiar with the non-poisonous ones before using any as food.

Description.—The British Hymenomycetes are divided into six Orders, the common Mushroom (Agaricus campestris) belonging to the Order Agaricini. Of Agaricus there are at least 782 British species. The varieties of campestris are numerous, hortensis being perhaps the one most frequently cultivated. A Mushroom consists of a pileus or cap, supported by a stalk, which is furnished with a ring. In the early stages of growth a thin film or veil connects this ring with the outer edge of the cap. On the underside of the latter are numerous plates or gills radiating concentrically from the stalk to the edge. The hymenium is situated on these gills, and bears large cells (basidia) each of which usually carries four spores, either on microscopic stalks or directly on the basidia, as in the common Mushroom. The pileus or

cap, with that portion of the stalk above the ring, is usually all that is gathered for use. This is the fruiting portion of the fungus, the vegetative portion consisting of threads or mycelia (spawn) that ramify in the soil or dung, and feed upon decaying vegetable matter.

Edible Mushrooms.—The common or field Mushroom naturally grows in pastures, fields, and open places, particularly where horses have been grazing. If the gills are pink or pale salmon when young and fresh, it is safe to say that the specimens belong to this species. The gills become brown or black with age, and in an advanced stage they should not be used. The Meadow or Horse Mushroom (A. arvensis) is common in similar

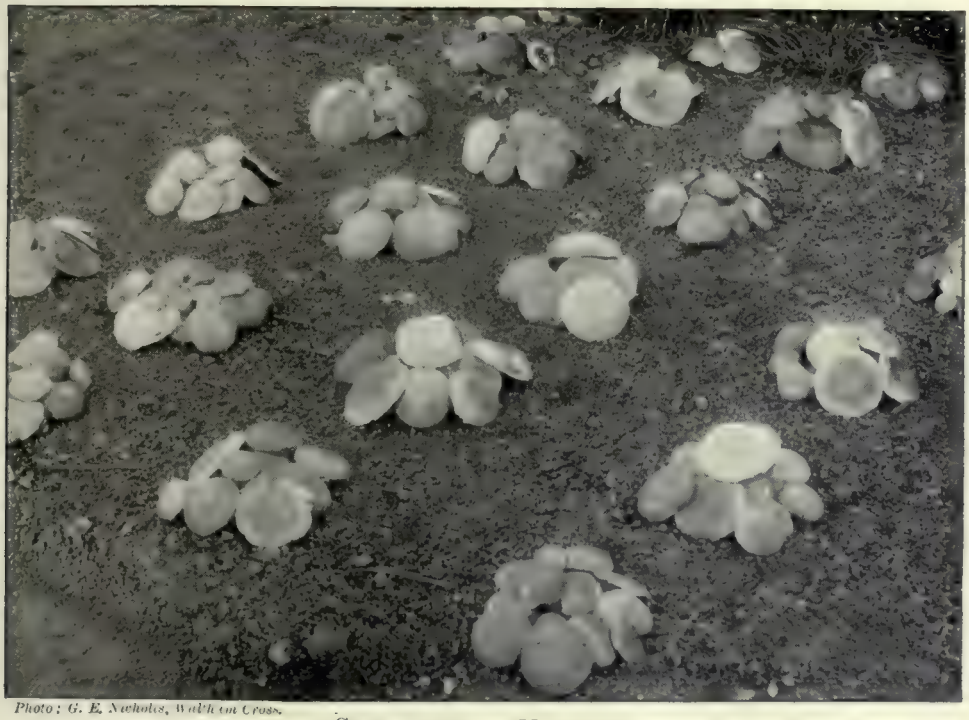


Photo: G. E. Nicholls, Waltham Cross.

Good clusters of Mushrooms.

places in the autumn; but while larger, it has a less delicate flavour. St. George's Mushroom (A. gambosus), with a large, nearly white cap, pale yellowish gills, and no ring on the stalk, appears in spring, and makes delicate and pleasant eating. The Fairy Ring Mushroom (Marasmius oreades) forms rings on lawns and pastures, and may be recognised by this as well as its small size, and few, whitish gills. Coprinus comatus may be distinguished by its cylindrical and pure white cap, covered with cloth-like scales. It should be gathered while the gills are white or slightly tinted with pink, not afterwards. It soon becomes purple, then black, and passes quickly into an inky-looking fluid. The above are all common and edible species.

Cultivation.—Spawn of the cultivated Mushroom is usually obtained from dealers in the form of bricks consisting of a mixture of clay and cow dung, permeated with the mycelium. Artificial cultivation is pursued in winter and spring; but with the advent of summer the prevailing temperature is usually too high, while the grubs of certain flies feed in such numbers in the Mushrooms as to render them useless. Summer crops raised out of doors are resorted to, to keep up the supply till the advent of the uncultivated harvest of the open meadows.

Preparation of Manure.—Horse droppings should be collected from the stables every morning where possible. Shake the rank litter out, and pile the droppings in a heap to ferment in an open shed where the roof will keep it dry. Turn the heap at intervals to prevent violent heating, and if the latter is likely to take place sprinkle the manure through a rosed watering pot, being careful not to give too much, or the fermentation will be retarded or entirely checked. When sufficient for a bed has been obtained, begin another heap with the fresh additions from the stables. Avoid wetting the manure too much, especially in winter, and reject manure from horses that have been having medicine, or the Mushroom beds will result in failure.

Indoor Culture.—A cellar not connected with a dwelling house is a good place for Mushroom beds, but any outhouse that can be closed may be used for the purpose. Where a large supply is required, a Mushroom house should be built on purpose, on the north aspect of a wall or other convenient place near hothouses whence a hot-water pipe or two can be introduced to maintain a temperature of 50° to 55° at all times. The house may

be of any shape—a lean-to will do. Beds may be made up on either side of the central pathway, and wide, well-supported shelves, one above the other, may be constructed for the accommodation of other beds. In making up a bed, shake up the manure evenly, and tread or beat it with the back of a spade till there is a depth of about 1′. When the heat has declined to 90°, insert pieces of spawn about the size of a hen's egg in holes made with a trowel 4″ to 6″ apart all over the bed, and cover them with the manure. Seven days afterwards, cover the bed with 1″ of good holding loam, beating it down with the spade. Some also cover the bed with hay to retain the heat and moisture till the young Mushrooms begin to appear, which they should do in the course of four to six weeks. When this takes place, spawn another bed.

Watering.—If the manure has been properly made, and not burned in the process of fermentation, no watering of the beds will be required in winter. During autumn and spring, if the surface becomes really dry, it should be sprinkled with a rosed watering pot after the first and each successive gathering. The water used should be of the same temperature as the bed. Heavy watering is dangerous at all times, and to be avoided.

Outdoor Culture.—Mushrooms are extensively grown on ridges in the open air. The manure is prepared in the usual way, and the beds are made up in ridges 3′ deep and triangular in section. These beds are spawned and covered with soil as for indoor culture. A thick layer of coarse litter is then placed over the bed to retain the heat, being removed only in order to gather the Mushrooms. Another and simpler plan of rearing Mushrooms in summer, when indoor culture is impracticable, is to take out a trench behind a north aspect wall, fill this with fermenting manure, spawn it, and cover with a layer of soil.

MUSK (*see also* MIMULUS).

The Musk of gardens is Mimulus moschatus, which is a favourite with many on account of its fragrance and bright yellow flowers. It is quite hardy, and is semi-wild in mild districts. It is also much used for growing in pots and hanging baskets. The Common Musk has been greatly superseded by the large-flowered form known as M. moschatus Harrisoni, or Harrison's Musk, which makes a finer plant for pots or for bedding. When grown in pots for exhibition it is generally trained over a flat wire frame attached round the pot. Musk is propagated by division or by seeds, in spring. It requires plenty of water.

MUSLIN MOTH.

Diaphora medica is closely allied to the Ermine moths. The female has wings of a semi-transparent white colour, the male smoke colour, while both have black spots. The larvæ are about 1″ in length, and covered with brown or black hairs. Hand-picking is the most effectual remedy known. As they are rather numerous in autumn it is fortunate that they confine their depredations chiefly to weeds.

MUSSÆNDA.

Stove evergreen shrubs or sub-shrubs, rarely herbs (*ord.* Rubiaceæ), with the general aspect of a Bouvardia. Propagation, by cuttings in spring. Loam and peat in equal proportions, with a good dash of sand, will suit.

Principal Species :—

erythrophylla, sulphur yel., bracts crim.
frondosa, 1′ to 8′, Aug., yel.
macrophylla, 8′, My., or.
speciosa, 6′, Aug., red.

Other Species :—

corymbosa, My., or.
glabra, 6′, Jy., or.
luteola, primrose.
pubescens, yel.
uniflora, wh.
— theifera.

MUSSCHIA.

Greenhouse herbs (*ord.* Campanulaceæ). Propagation, by seeds when obtainable, also by cuttings in sand under a bell-glass. For soil, use sandy, fibrous loam and a third of leaf mould.

Principal Species :—

aurea, 1′ to 2′, sum., yel. (*syn.* Campanula aurea).
Wollastoni, 6′, yel., calyx pur.

MUSTARD AND CRESS.

As these two popular salad plants are so closely associated at the table and require the same cultivation, they may well be treated of together. The Mustard is Brassica (*syn.* Sinapis) alba, and the Cress is Lepidium sativum. Ground Mustard is made from the seeds of Brassica alba and B. nigra.

Soil.—A fine, rich soil is the best for outdoor cultivation and for forcing.

Sowing Outside.—This may be done from the end of March until about the beginning of May in a sheltered, warm position, and from the beginning of May to the middle of September in a cooler and shadier spot. Sow thickly. Keep the surface of the soil very fine. Cress should be sown from three to five days earlier to come in at the same time as the Mustard. Water plentifully in dry weather.

Sowing Indoors.—These saladings are best sown in boxes about 1′ square and from 3″ to 4″ deep, filled with fine, free soil or rotten tan watered after sowing, and covered with a sheet of glass. Place in a warm house or a moderate hotbed, and the salads should be fit for use in ten days or a fortnight. Or seed may be sown on damp flannel.

Varieties :—

Common Cress, only the seed leaves being used; Australian or Broad Leaved, tender and piquant; Triple Curled, of good flavour, and good also for garnishing; Winter, or American, is Barbarea præcox.

The usual Mustard used is the White, but some prefer the larger plant, known as the Chinese, which is more pungent.

MUTISIA.

Stove, greenhouse, or half-hardy climbers (*ord.* Compositæ), with showy yellow, orange, or scarlet flowers. Propagation, by cuttings in sand in spring, under a bell-glass, in slight bottom heat. Sandy loam with a little peat will suit. M. Clematis has been flowered against a wall in the south of England. Others might be tried.

Musk Hyacinth (*see Muscari moschatus*).
Musk Melon (*see Cucurbita moschata*).
Musk Orchis (*see Herminium*).

Mussel Scale (*see Mytilaspis*).
Mussinia (*see Gazania*).
Mustard, Hedge (*see Erysimum*).

Principal Species :—

Clematis, 6′ to 8′, sc.
decurrens, or., hdy. when established.
ilicifolia, 10′.
versicolor, grh., or., br.
viciæfolia, grh. or hlf-hardy, or.

MYGINDA.

Stove evergreen shrubs (*ord.* Celastrineæ), with minute flowers at the apex of short stalks, and mostly white. Propagation, by cuttings of ripe shoots in sand. Fibrous loam and peat in equal proportions, with plenty of sand, will meet their requirements.

Principal Species :—

latifolia, 4′, Ap., wh.
myrtifolia (now Pachystima Myrsinites).

MYOPORUM.

Evergreen greenhouse shrubs (*ord.* Myoporineæ), with white flowers in axillary clusters. Propagation, by cuttings of half-ripe shoots under a bell-glass in spring. Loam and peat in equal ratio, with plenty of sand and some nodules of charcoal, will suit.

Principal Species :—

Desertii, 2′.
lætum, 2′.
serratum, 6′, My., wh.,
pur. (*syn.* insulare and tasmanicum).
— tuberculatum, 3′.

MYOSOTIDIUM.

A hardy or half-hardy, though often short-lived, herbaceous perennial (*ord.* Borragineæ). Propagation, by seeds when obtainable; also by division in spring. Any good garden soil will suit, but it should be moist, and the situation shaded. Peat and leaf mould greatly assist in retaining the moisture.

Only Species :—

nobile, 1½′, Ap., My., bl., wh. New Zealand Forget-me-Not.

MYOSOTIS. (Forget-me-not.)

Description.—Charming and universally admired annual, biennial, or perennial plants (*ord.* Borragineæ), of much beauty in beds, borders, rockeries, or in pots for the greenhouse or conservatory. In spring the Myosotises make beautiful effects either in beds by themselves, or associated with other flowers.

Propagation.—All the species by seeds, the named varieties and choice forms, as well as the perennials, by cuttings under a hand-light or glass in summer.

Soil.—Common soil. Moist and rather shady places are preferred, but shade is not necessary where the plants are taken up after having been used for spring bedding.

Other Cultural Points.—Seedlings for bedding should be pricked out early and encouraged to make sturdy, bushy growth before winter.

Principal Species and Varieties :—

alpestris, 3″, Jy., bl. (*syn.* rupicola).
— elegantissima, wh., ro., bl.
australis, 6″, My., bl.
dissitiflora, 6″ to 12″, Feb., bl.; very beautiful.
— alba, wh.
— Dyeræ, bl.
— elegantissima, lvs. edged wh.
— grandiflora, bl.
— splendens, bl.
palustris, 6″ to 12″, spr., bl., semperflorens, probably a var. of palustris, good for moist soil (*syn.* scorpioides). Marsh Forget-me-not.
sylvatica, 1′ to 2′, spr., bl. (*syn.* oblongata).
— compacta aurea, yel. lvs.
— elegantissima, wh., bl., pk.
— grandiflora, large flowers.
— lithospermifolia, fine flowers.

Other Species and Varieties :—

arvensis, 6″, Je., bl.
— alba, wh.
azorica, 1′, Aug., bl.; tender.
cæspitosa, 9″, Je., bl.
— Rehsteineri, bl.
collina, 4″, My., bl.
intermedia, 6″, Ap., bl.
litoralis, 9″, Ap., bl.
Lyallii, 3″ to 6″, bl.
Traversii, 4″ to 8″, pale yel.
Welwitschii, 4″, My., bl. (*syn.* cintra).

Garden Forms (most coming fairly true from seed) :—

Bexley Gem.
Cluster-flowered, bl., wh.
dissitiflora Perfection.
Imperatrice Elizabeth.
Jewel.
palustris Little Queen.
Princess Maud.
robusta grandiflora.
sylvatica Distinction.
Victoria.

MYRCIA.

Stove evergreen shrubs (*ord.* Myrtaceæ), allied to the Myrtle, and all producing white flowers. Propagation, by cuttings of young wood beginning to get quite firm at the base, in early summer, inserted firmly in pots of sand and plunged in a propagating case. Soil, equal parts of fibrous loam and peat, with plenty of sand to keep it open.

Principal Species :—

amplexicaulis, 5′.

MYRIACTIS.

Half-hardy herbaceous plants (*ord.* Compositæ), allied to the Daisy, and requiring frame protection in winter. Propagation, by seeds in a greenhouse, also by division in spring. A light, sandy soil will suit. Nepalensis, producing white flowers in June, is the only species introduced (*syn.* Gmelini).

MYRIALEPIS.

A genus of Palms (*ord.* Palmæ) of which only one, Scortechini, from the Malaya district, is in cultivation at Kew.

MYRIAPODA.

An order of animals of low organisation, belonging to the group Chilognatha, often found feeding upon the roots of Potatoes, Turnips, Cabbages, Onions, and other vegetables. They are carnivorous and herbivorous, and live about two years. The principal species are, Julus guttatus, londinensis, terrestris, punctatus, latestriatus, and pilosus, all known as Snake Millipedes; and Polydesmus complanatus, termed the Flattened Millipede. The latter forms a transition to the Scolopendræ, of the group Chilopoda, which includes the very common species Geophilus longicornis, a slender animal, 2½″ to 3″ long, with 102 to 110 feet. Clear lime water, soot, nitrate of soda, and common salt are remedies.

MYRICA. (Candleberry Myrtle.)

Hardy or greenhouse shrubs (*ord.* Myricaceæ), best known in this country from the native M. Gale, the Sweet Gale, Dutch or Bog Myrtle, which has an agreeable scent and has been used among clothes to keep away moths and vermin. Its leaves have also been used instead of Hops, and the berries were put into beer to make it more intoxicating. Cerifera, the Candleberry Myrtle, and carolinensis, produce

Myanthus (*see Catasetum*).
Mycaranthus (*see Eria*).
Mylocaryum (*see Cliftonia*).

Myriadenus (*see Zornia*).

berries from which candles have been made. Myricas are propagated by seeds, layers, cuttings, and division, and like a rather moist, sandy peat.

Principal Species :—

asplenifolia, 4′, Ap., hdy., br. (*syn.* Comptonia asplenifolia).
californica, 4′, Jy., grn.
carolinensis, 5′, My., grn.
cerifera, 20′, My. (*See* figure.)
Gale, 4′, My.
quercifolia, 3′, Je., grh.
rubra, 8′, My., grh., grn.; fruit edible (*syns.* esculenta and Nagi)

Myrica cerifera.

MYRICARIA.

A small genus (*ord.* Tamariscineæ) of hardy evergreen shrubs. Propagated by cuttings under a hand-light. Soil, loam and sandy peat.

Principal Species :—

germanica, 8′, Jy., pk. (*syns.* dahurica of gardens and Tamarix germanica).

MYRIOCARPA.

Stove shrubs (*ord.* Urticaceæ), with long, drooping spikes carrying hundreds of tiny green flowers. Propagated by cuttings. Soil, peat and loam.

Principal Species :—

stipitata, 15′, sum., grn.

MYRIOPHYLLUM.

Small-growing, hardy perennial aquatics (*ord.* Haloragеæ). Propagated by division. They thrive in ponds or ditches.

Principal Species :—

alterniflorum, 1′, Jy., grn.
verticillatum, 1′, Jy., grn.

MYRISTICA. (Nutmeg.)

Stove evergreen trees and shrubs (*ord.* Myristiceæ) whose economic value lies in fragrans, which produces the nutmeg of commerce. Propagated by cuttings. Soil, fibrous peat, loam, and sand.

Principal Species :—

fatua, 25′, sum., grn., wh. Long or Wild Nutmeg.
fragrans, 25′, Je., pale yel. (*syns.* moschata and officinalis).
proserpinacoides, 6″ to 8″, st., grh., lvs. feathery, trailer (*syn.* Herpestes reflexa of gardens).

MYRMECODIA.

Interesting epiphytes (*ord.* Rubiaceæ), having a large, swollen, and tuberous rhizome, the larger part of which should be kept above the soil. They succeed in a stove in peaty soil, suspended in a Teak basket, but possess no horticultural value. In their native haunts ants take up their abode in the stem, producing the swollen appearance. Such plants are known as "myrmecophilous." Specimens are imported from tropical Australia, or seeds may be sown.

Principal Species :—

Antoinii, 1′, Jan., wh.; spiny.
Beccarii, 1′, Feb., wh.
vitiensis (correctly Hydnophytum longiflorum).

MYROBALAN PLUM (*see* Prunus cerasifera).

MYROSMA.

A small group of tropical American plants (*ord.* Scitamineæ), several giving off fragrance when crushed. (*See* Calathea for treatment.)

Principal Species :—

Gladioli.
hemisphærica.
Lubbersii.

MYROSPERMUM.

Stove evergreens (*ord.* Leguminosæ). Propagated by cuttings in summer. Soil, loam, peat, and coarse sand. Several species are now referred to Myroxylon.

Principal Species :—

frutescens, 10′, Jy., ro.
toluiferum (*see* Myroxylon toluiferum).

MYROXYLON.

Stove evergreen trees (*ord.* Leguminosæ), requiring similar treatment to Myrospermum. The value of the genus lies in the fragrant balsams produced by some species.

Principal Species :—

peruiferum, 40′, sum., wh. Balsam of Peru.
toluiferum, 40′, sum., wh. Balsam of Tolu.

MYRRHIS. (Sweet Cicely, Myrrh.)

Hardy herbaceous perennials (*ord.* Umbelliferæ), propagated by seeds, cuttings, or division. Ordinary garden soil suits. Myrrh was formerly much cultivated, and used as a pot herb and in salads.

Principal Species :—

odorata, 2′, My., wh. British Myrrh.

MYRSINE.

Greenhouse evergreen shrubs and trees (*ord.* Myrsineæ), propagated by cuttings of half-ripened shoots. Soil, sandy loam and peat.

Principal Species :—

africana, 4′, spr., br., grn., pk.
capitellata, 6′ to 30′, win., yel., grn.
semiserrata, 6′ to 30′, Jan., pk.

Myrioblastus (*see Cryptocoryne*).
Myriopteris (*see Cheilanthes*).

Myrobalan Tree (*see Terminalia*).
Myrobalanus (*see Terminalia*).
Myrobroma (*see Vanilla*).

MYRSIPHYLLUM.

The graceful climbing plant known to florists as Smilax is commonly labelled Myrsiphyllum asparagoides in gardens, but its correct title is Asparagus medeoloides, which *see*.

MYRTUS. (MYRTLE.)

Description.—Very ornamental stove, greenhouse, or nearly hardy shrubs or trees (*ord.* Myrtaceæ) which are often prized for their scent as well as for their flowers and foliage. The Common Myrtle, communis, of which there are a good many varieties, is hardy in some very mild districts on a wall or in a sheltered position. Many of the plants formerly known as Myrtles have been transferred to other genera.

Propagation. — By cuttings of half-ripened or older shoots under a glass in slight heat, the stove species requiring greater heat.

Soil.—Sandy loam and leaf mould, or a little peat.

Other Cultural Points.—Watering needs to be carefully attended to, and the beauty of the plants is much increased if they are frequently syringed during the summer months. The Myrtles are amenable to training to trellises of any desired shape, and also make pretty standards.

Principal Species and Varieties :—

affinis, 6′, Je., grh., pur.
bullata, 15′, Jy., grh., pale pk. (*see* figure).
communis, 4′ to 10′, Jy., grh. or hdy., wh.
— bœtica, 6′, Jy.
— belgica, 6′, Jy.
— flore-pleno, 6′, Jy., double flowers.
— italica, 6′, Jy.
— lusitanica, 6′, Jy.
— maculata, 6′, Jy.
— mucronata, 4′, Jy.
— romana, 4′, Jy.
— tarentina, 6′, Jy.
— variegata, 6′, Jy.; variegated lvs.
Luma, 3′, Jy., grh., wh. (Luma of Molina is Eugenia apiculata).
— apiculata, 3′, Jy., wh. (*syns.* Eugenia apiculata and E. Luma, var. apiculata).
tenuifolia, 5′, grh.
Ugni, 4′, My., grh. or hdy., wh. (*syn.* Eugenia Ugni).
— variegata.

For other plants formerly included with Myrtus, *see* EUGENIA, MYRCIA, PIMENTA, RHODAMIA, and RHODOMYRTUS.

MYSTACIDIUM.

Tropical and South African Orchids (*ord.* Orchidaceæ) closely allied to Angræcum, and needing similar treatment, but the more southern species should have a lower temperature. Few have any pretensions to horticultural value.

Principal Species :—

distichum, 6″, Aug., grn., wh. (*now* Angræcum distichum).
filicorne, 3″, Dec., wh., grn. spur.

MYTILASPIS.

One of the most dreaded of scale insects is Mytilaspis Pomorum, known popularly as the "Apple Mussel Scale," so named because the pest chiefly attacks Apple trees, and forms the scale, which serves as covering to the female larva, and also protects the eggs and new brood. The perfect male insect has wings and an extremely brief life. Trees infested must be dealt with during winter; the best plan is to scrape the trunk and branches with a blunt instrument, syringing with soapy water and following with a good scrubbing, using a stiff brush and strong soft-soapy water. Every effort should be made to cleanse infested trees during winter, following up the scrubbing process by spraying the trees with either a kerosene emulsion, or caustic soda and potash mixture, the latter for preference. (*See* INSECTICIDES.)

MYZUS.

Among the many genera forming the class of Aphides, or Plant Lice, Myzus is one of the worst. The chief species, Cerasi and Ribis, secrete honeydew, and so, besides feeding upon the juices found in the leaves of Cherry trees and Black Currant bushes, they cause the leaves to curl up and stick together with their exudations. Forcible syringing is a good remedy, using warm, soapy water, with tobacco or Quassia extract added. For Cherries and other subjects under glass the same remedies are applicable. Under glass, if fumigation or vaporising be practised at regular intervals, these aphides will not prove troublesome. Wall trees and bushes in overshadowed positions are most liable to attack. Liberal cultural methods should follow treatment for the extermination of Myzus.

NÆGELIA.

A genus of stove herbaceous perennials (*ord.* Gesneraceæ), allied to Achimenes and Gesnera, and requiring identical treatment with the latter

MYRTUS BULLATA.

genus. The following species are synonymous with the Gesneras bearing similar names :—

Principal Species :—

cinnabarina, 2′, sum., sc.
geroltiana, 2′, sum., aut., or., sc.
multiflora, 2′, Aug., wh.
(*syns.* Achimenes amabilis, A. multiflorus, Gesnera amabilis, and Nægelia amabilis).
zebrina, 2′, aut., yel., sc.

Nageia (*see Podocarpus*).
Nagelia (*see Cotoneaster*).

NAILS.

Formerly the cast iron wall or garden nails were indispensable, but latterly they have fallen largely into disuse, having given place to wires strained close to walls and fences, to which the fruit or other trees are tied. Against dwelling-houses it is now a common practice to provide wires or light wooden trellises for the support of climbing plants. The nailing of fruit trees to walls has little to recommend it; the branches are too close to the shelter, and at the same time every nail-hole provides a retreat for some of the many pests attacking such subjects. Nails are sold by weight—generally about 3d. per lb.

NAMA.

Stove and greenhouse annuals and perennials (*ord.* Hydrophyllaceæ) that are not often seen. Propagation, by seeds and division in heat. Soil, fibrous peat, loam, and coarse sand.

Principal Species :—

jamaicense, 2', Je., st. ann., bl., wh.
Parryi, 4', sum., hlf-hdy. per., pur., lil.
undulatum, Je., grh., vio.

NANDINA.

Greenhouse evergreen shrubs (*ord.* Berberideæ). Domestica, known as the Chinese Bamboo, 6', July, white, is the only species. It will grow out of doors in sheltered spots in the southern counties. Propagation, by cuttings in very sandy peat beneath a bell-glass over mild bottom heat. Compost, fibrous loam and peat, with some sand.

NANNORHOPS.

Stove Palms (*ord.* Palmæ). Propagation, by imported seeds. Soil, loam and coarse sand with good drainage. The only species is ritchieana, from whose leaves fans are made. Under favourable conditions it will reach a height of 30'.

NANODES.

Although, to be strictly correct, the plants known in gardens as Nanodes (*ord.* Orchidaceæ) ought to be included under Epidendrum, yet so distinct are they in habit and in the size and shape of their flowers, that no excuse seems necessary for referring to them here under their more popular name. They are all from western tropical South America, where they inhabit the higher Andes, and consequently under cultivation they succeed admirably under cool conditions such as suit most Odontoglossums and Masdevallias. Grow in somewhat shallow baskets, affording ample drainage, and using a compost of fibrous peat and live sphagnum moss. Suspend near the roof glass. When well established they have a partiality for a position close to the spot where top air is admitted. Drought must be avoided, but the water supply may be reduced when growth is finished. Propagation is by division.

Principal Species :—

Medusæ, 4", sum., aut., lurid pur., growths drooping (now Epidendrum Medusæ).

Other Species :—

discolor, 3", Aug., pur. (now Epidendrum discolor).
Mantinii, 3", aut., whitish grn., spotted pur. br. (now Epidendrum mantinianum).
Matthewsii, 3", aut., pur., lip blood pur., procumbent growth (now Epidendrum Matthewsii).

Nailwort (*see Paronychia*).

NAPÆA.

Hardy herbaceous perennials (*ord.* Malvaceæ). Propagation, by division or seeds; the plants thrive in any fertile soil.

Principal Species :—

dioica, 6', Jy., wh. (*syn.* Sida Napæa).

NAPOLEONA.

Evergreen shrubs (*ord.* Myrtaceæ) requiring stove heat. Propagation, by cuttings of half ripe wood beneath a bell-glass. Soil, fibrous loam and peat in equal parts, with sand.

Principal Species :—

imperialis, 6', spr., cream wh. (*syns.* Heudelotii and Vogelii).
Whitfieldii, 6', Ap., My., crim. (*syn.* imperialis of Hooker).

NARAVELIA.

A stove evergreen climber (*ord.* Ranunculaceæ), allied to Clematis. Propagation, by cuttings in sandy peat. Soil, fibrous loam and peat, with sand.

Principal Species :—

zeylanica, 10', My., yel.

NARCISSUS.

Description.—The Narcissus (*ord.* Amaryllideæ) is one of the most useful and popular of bulbous plants, and its value for the decoration of the garden, conservatory, or window, and for the supply of cut flowers, is incalculable. From a purely commercial point of view, also, it is an exceedingly important article, as it is grown by acres. For decorative purposes it has no rival in its season, and its value for all purposes has been greatly increased by the production of many beautiful varieties and hybrids. The progress in this direction has been enormous since the time of Dean Herbert, who, with Backhouse and Leeds, was a pioneer of crossing the Narcissi. At the present time there are many engaged in this enterprise, which has had the result of improving and giving variety to the flower. Annually a large number of new Narcissi are introduced, and seem to be readily absorbed at high prices, ranging from a few shillings to £30 by retail.

Classification.—For the purpose of classification the Narcissi have been arranged by Mr. J. G. Baker into three great groups, called Magni-coronati, Medio-coronati, and Parvi-coronati, so termed from the length of the crowns or trumpets. The first consists of those which have the "corona funnel-shaped or cylindrical, as long as, or longer than, the perianth segments." The second have the "corona cup-shaped, about half as long as the perianth segments," and the Parvi-coronati have the "corona small, obconic or saucer-shaped." Bulbocodium, the Hoop Petticoat, and the common English Lent Lily, Pseudo-Narcissus, may be taken to represent the Magni-coronati, commonly known as the Ajax, or Trumpet Daffodils. Familiar representatives of the Medio-coronati are the varieties of N. incomparabilis, such as Sir Watkin and others with similarly formed flowers. The Parvi-coronati have good representatives in the poeticus type and its varieties, or in the Tazettas, as represented by

Napoleon's Weeping Willow (*see Salix babylonica napoleona*).

Univ. of

NARCISSI.

1. S A. DE GRAAFF; 2. STELLA MAXIMA; 3. VESUVIUS: 4. KATHERINE SPURRELL; 5. VICTORIA; 6. LADY GODIVA;
7. PRINCESS MARY · 8. MRS. CAMM · 9 MADAME DE GRAAFF; 10. PRINCESS IDA.

the common Paper White or Double Roman. For convenience of selection a good division of the Trumpet and incomparabilis Narcissi has been made by the adoption of the following sections: Trumpet forms—yellow; bicolors (yellow corona and white perianth), white and sulphur. Incomparabilis forms—incomparabilis, with the longest crowns of the forms of this group, except the Leedsii varieties; Barrii, which have the cups shorter in proportion to the length of the perianth segments; Leedsii, which have the cups or crowns white or passing off to white; Humei, which have drooping flowers, with perianths drooping over the crown; Backhousei, with trumpet shaped crowns; and Nelsoni, with goblet shaped crowns and white perianths.

Photo: Cassell & Company, Ltd.

NARCISSUS DUKE OF BEDFORD (*see p.* 103).

Cultivation.—The cultivation of the Narcissus has been pretty fully dealt with under the title DAFFODIL (which *see*). It may, however, be advisable to give a few details regarding the following:—

Forcing Narcissi.—While the ordinary Trumpet Daffodils must be brought on slowly, and will not do well unless carefully treated, the others are more amenable to forcing, and such flowers as the Paper White and others of the Tazetta section are very suitable for early work. By planting as early as bulbs can be obtained, the Paper White may be had in flower as early as November, and bulbs grown in a warm climate are imported for the earliest work. None should have bottom heat, but plenty of water and air, and be kept near the glass. Narcissi may also be grown thickly in boxes for cutting.

Narcissi in Glasses or Bowls.—The introduction of a form of Tazetta, under the name of Chinese Sacred Lily, or Joss Flower, has attracted attention to the possibility of growing this and other Narcissi in bowls or glasses of water, as well as in Cocoanut fibre refuse. The bowls should be partly filled with clean pebbles, and the water should only rise to the base of the bulbs (*see p.* 102).

Selections of Narcissi:—

[NOTE.—A selection for small gardens will be found under DAFFODIL. Those which follow will be partially superseded in future years by the introduction of novelties and the cheapening of those which are at present expensive.]

A Selection of Species and Varieties :—

Magni-coronati :—

Bulbocodium, Hoop Petticoat, 6″ to 8″, Ap., yel. (*syn.* Corbularia).
— citrinus, sulphur yel.
— conspicuus, yel.
— Graellsii, yel.
— monophylla, wh.; grow in frames or pots (*syn.* Clusii).
— nivalis, wh.

Narcissi in a Bowl (*see p.* 101).

Yellow Trumpets :—

abscissus.
Ard Righ.
Captain Nelson.
coronatus.
cyclamineus.
Emperor.
English Lent Lily (N. Pseudo-Narcissus).
Glory of Leyden.
Golden Spur.
Henry Irving.
Johnstoni Queen of Spain.
Johnstoni King of Spain.
Lady Helen Vincent.
major.
maximus.
— minimus.
— minor.
M. J. Berkeley.
nanus.
obvallaris.
P. R. Barr.
Pseudo-Narcissus.
Santa Maria.
Sir Wm. Harcourt.
spurius.

Bicolors :—

Ada Brooke.
Dean Herbert.
Empress.
grandis.
Horsefieldii.
J. B. M. Camm.
John Davidson.
John Parkinson.
obvallaris.
Madame Plemp.
Michael Foster.
Mrs. Walter Ware.
princeps.
scoticus.
variiformis (*syn.* nobilis).
Victoria.

White and Sulphur :—

albicans.
Apricot.
cernuus.
— pulcher.
C. W. Cowan.
Grace Darling.
Lady Somerset.
L'Innocence.
Madame de Graaff.
moschatus.
Mrs. J. B. M. Camm.
Mrs. Thompson.
Mrs. Vincent.
pallidus præcox.
Sir Stafford Northcote.
Snowflake.
tortuosus (*syn.* Leda).
W. P. Milner.
William Goldring.

Double Trumpets :—

capax plenus, lemon.
cernuus plenus, wh.
lobularis plenus, yel.
minor plenus, yel. (*syn.* Rip van Winkle).
plenissimus, yel.
scoticus plenus, wh., yel.
Telamonius plenus, yel.

Medio-coronati (*Incomparabilis*) *:—*

Autocrat.
Beauty.
C. J. Backhouse.
Commander.
Cynosure.
George Nicholson.
Gloria Mundi.
Gwyther.
James Bateman.
King of the Netherlands.
Mabel Cowan.
Mary Anderson.
Princess Mary.
Queen Bess.
Queen Sophia.
Red Star.
Sir Watkin.
Stella superba.
Vesuvius.

Incomparabilis, double varieties :—

Butter and Eggs.
Codlins and Cream (*syn.* Sulphur Phœnix).
Eggs and Bacon (*syn.* Orange Phœnix).
Golden Phœnix.

Barrii :—

conspicuus.
Crown Prince.
Dorothy E. Wemyss.
Flora Wilson.
Golden Gem.
Maurice Vilmorin.
Mrs. C. Bowley.
Sensation.
Siddington.

Leedsii :—

amabilis.
Beatrice.
Duchess of Brabant.
Duchess of Westminster.
Gem.
Hon. Mrs. Barton.
Katherine Spurrell.
M. Magdaline de Graaff.
Minnie Hume.
Mrs. Langtry.
Palmerston.
Princess of Wales.

Humei :—

Hume's concolor.
Hume's Giant.

Backhousei :—

Backhousei.
Border Maid.
William Wilks.
Wolley Dod.

Nelsoni :—

aurantius.
major.
minor.
Mrs. C. J. Backhouse.
pulchellus.
William Backhouse.

Other Medio-coronati :—

Bernardi.
— H. E. Buxton.
juncifolius.
Macleaii.
odorus.
— heminalis.
— plenus.
— rugulosus.
poculiformis (*syn.* montanus).
triandrus.
— albus.
— calathinus.
— concolor.
— pulchellus.
tridymus.
— A. Rawson.
— Cloth of Gold.
— S. A. de Graaff.
— The Twins.

Parvi-coronati (*Burbidgei*) *:—*

Baroness Heath.
Beatrice Heseltine.
Burbidgei.
Ellen Barr.
Falstaff.
John Bain.
Little Dirk.
Model.
Sequin.

Poeticus :—

poeticus.
— Almira.
— fl.-pl.
— grandiflorus.
— ornatus.
— patellaris.
— Poetarum.
— recurvus.
— verbanensis.

Tazetta, or Polyanthus :—

Bathurst.
Bazelman major.
Double Roman.
Gloriosa.
Grand Monarque.
Her Majesty.
Maestro.
Paper White.
— Snowflake.
Queen of the Netherlands.
Soleil d'Or.
States General.
White Pearl.

Other Sections of Parvi-coronati :—

biflorus.
— gracilis.
— tenuior.
Jonquilla.
— flore pleno.
— orientalis.
serotinus.

Selection of Newest Narcissi :—

Big Ben (Yellow Trumpet).
Cassandra (Poeticus).
Duke of Bedford (Bicolor Trumpet) (*see p.* [101).
Glory (Poeticus).
King Alfred (Yellow Trumpet).
Lord Roberts (Yellow Trumpet).
Lucifer (Incomparabilis).
Madame de Graaff (White Trumpet).
Maggie May (Leedsii).
Monarch (Yellow Trumpet).
Mrs. Morland Crosfield (Bicolor Trumpet).
Red Coat (Incomparabilis).
Van Waveren's Giant (Yellow Trumpet, *see* figure).
Weardale Perfection (Bicolor Trumpet).

Photo : Cassell & Company, Ltd.

NARCISSUS VAN WAVEREN'S GIANT.

The Narcissus Fly (Merodon equestris) is a troublesome pest, which appears to be growing more numerous both on the Continent and in this country. All bulbs which show signs of decay or softness should be examined for the maggots or larvæ, and destroyed by fire if these are present. Dressing the soil with gas lime (which *see*) is the preventive at present meeting with most approval.

NARDOSTACHYS. (SPIKENARD.)

A hardy perennial (*ord.* Valerianeæ). Propagation, by division. Any fertile garden soil suits.

Only Species :—

Jatamansi, 2′, Sep., pk.

NARTHECIUM. (BOG ASPHODEL.)

Dwarf-growing, hardy herbaceous plants (*ord.* Liliaceæ) of Iris-like habit. Propagation, by division in spring. Soil, peat and coarse sand in a cool position.

Principal Species :—

ossifragum, 3″, Jy., yel. — americanum, narrower lvs.

NASTURTIUM.

The plant commonly known in gardens by the name of Nasturtium is a Tropæolum (which *see*). The true Nasturtiums are hardy herbs of aquatic or terrestrial habit, but of little value for garden purposes. The common Water Cress (*see* CRESS, WATER) is the most useful of those known.

Principal Species :—

officinale, Water Cress, Je., hdy. per., wh.

NAUCLEA.

Stove evergreens (*ord.* Rubiaceæ). Propagation, by cuttings of half-ripened wood in sandy soil,

Narthex (*see Ferula*).
Nasonia (*see Centropetalum*).
Native Oak (*see Casuarina*).
Nauchea (*see Clitoria*).

beneath a bell-glass, over bottom heat. Soil, loam and peat in equal parts, with sand.

Principal Species :—

Adina (now Adina globiflora).
Cadamba, 20′, sum., or. (now Anthocephalus morindæfolius).
purpurea, 15′, My., pur.
undulata, 20′, My., yel., fragrant.

Photo: Cassell & Company, Ltd.

NECTARINE RIVERS'S ORANGE.

NAVELWORT.

The plant popularly known as the Navelwort is Cotyledon umbilicus, a native species producing yellow flowers about midsummer. Omphalodes linifolia is occasionally called Venus's Navelwort.

NAVET, or NAVEW.

These were at one time fairly common popular names of Brassica Napus, a plant now generally known as Rape.

NECTARINE.

Valuable, choice fruits responding to the same culture as Peach, which *see*.

Selection of Varieties :—

Early (July to mid-August) :—
Cardinal. Early Rivers. Lord Napier.

Second Early (mid-August to early September) :—
Rivers's Orange (*see* figure). Goldoni. Stanwick Elruge.

Mid-season (beginning to mid-September) :—
Dryden. Humboldt. Pine Apple.

Late (mid-September to early October) :—
Prince of Wales (*see* figure). Spencer. Victoria.

NECTRIA.

A genus of microscopic fungi that seem ever ready to take advantage of any weakness in the bark of trees and shrubs, and especially in the case of Apple trees. This being so it is essential that no injury is done to the bark during planting, etc., and that in pruning clean cuts are made, the larger wounds being dressed with Stockholm tar. Canker is one of the most dreaded diseases in fruit gardens, and is caused by the working of Nectria ditissima (*see* APPLE CANKER), which, once a spore has germinated and become established in an abrasion, grows rapidly during autumn and early winter. It endeavours to encircle the stem or branch on which it lives, and once this is done the part of the tree above the wound is almost certain to die. Another species, Nectria cinnabarina, is found on Currant bushes, the fungus appearing as small, bright red knobs containing filaments and spores capable of increasing the species.

Naumburgia (*see Lysimachia thyrsiflora*).
Nautilocalyx (*see Episcia*).
Navarretia or Navarrettia (*see Gilia*).
Navelwort (*see Cotyledon*).
Neapolitan Violet (*see Violet*).
Necklace Poplar (*see Populus monilifera*).
Nectaroscordum (*see Allium*).

NEGUNDO.

The pretty shrubs or small trees formerly called Negundo are now included with Acer, which *see*.

NEILLIA (*syn.* ADENILEMA).

Hardy shrubs (*ord.* Rosaceæ). Propagation, by cuttings, in light soil under a hand-light. Soil, fertile loam.

Principal Species :—

amurensis, 7′, Jy., wh. (*syn.* Spiræa amurensis).
opulifolia, 8′, Je., wh. (*syn.* Spiræa opulifolia). There are one or two good vars., including the golden-leaved lutea, and the green-leaved mollis.
thyrsiflora, 6′, sum., wh.
Torreyi, 5′, sum., pure wh. (*syn.* Spiræa monogyna).

NELITRIS.

Stove evergreen shrubs (*ord.* Myrtaceæ). Propagation, by cuttings of half-ripened wood in sand, beneath a bell-glass, over bottom heat. Soil, fibrous loam, peat and leaf mould, with coarse sand.

Principal Species :—

ingens (now Eugenia brachyandra).
paniculata, 10′, My., wh. (now Decaspermum paniculatum).

NELUMBIUM. (SACRED BEAN. WATER BEAN. EGYPTIAN LOTUS.)

Description.—Nelumbiums are handsome aquatic plants (*ord.* Nymphæaceæ) with exquisite flowers and pretty leaves. In past ages speciosum was the emblem of fertility and sanctity in Egypt, and it is still prized in India and China as a sacred flower. The nuts are edible, and the rootstocks of luteum are eaten by North American Indians.

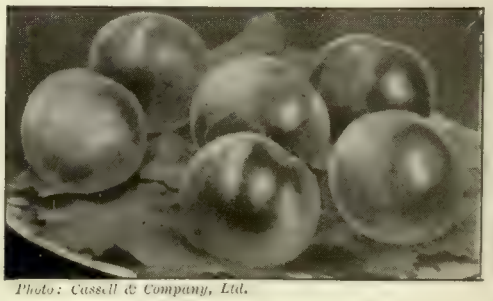


Photo: Cassell & Company, Ltd.

NECTARINE PRINCE OF WALES.

Propagation.—By seeds, sown in winter under glass, or by division of the roots immediately after growth has commenced.

Other Cultural Points.—Nelumbiums are almost hardy in Great Britain, but in only a few places can they be permanently planted in the open,

Nectris (*see Cabomba*).
Needle Furze (*see Genista anglica*).
Negretia (*see Mucuna*).
Negro's Head (*see Phytelephas macrocarpa*).
Negundium (*see Acer*).

unless the water be heated by pipes in winter. They may, however, be grown in tubs plunged outside in summer and protected under glass in winter. They are fine plants for a tank under glass, where they may have a temperature of 45° to 50°, or more when at rest. They grow in good loam and well rotted manure, and should be planted about 1′ below the surface of the water.

Principal Species and Varieties :—

luteum, Jy., yel., sweet. A handsome flower, rather like a double Tulip.
speciosum, Jy., wh. tipped ro., sweet (*see* figure). Many vars., the following being good: album grandiflorum; album plenum, wh. (*syn.* Shirooman); album striatum, wh., striped car.; Hudson's var. japonicum roseum, red; kermesinum, pk.; Osiris, bright red: pekinense rubrum, double, red; pygmæum, dwarf, ro.; roseum grandiflorum; and roseum plenum, deep ro.

NEMASTYLIS.

Half-hardy bulbous plants (*ord.* Irideæ) responding to the same treatment as Gladiolus, which *see*.

Principal Species :—

cœlestina, 2′, Je., bl.
geminiflora, 6″, sum., bl., yel., blk.; flowers very fleeting (*syn.* acuta).

NEMATANTHUS.

Stove evergreen climbers (*ord.* Gesneraceæ) that are worthy of attention. Propagation, by cuttings in sandy soil. Soil, fibrous loam and peat with a little leaf mould and sand.

Principal Species :—

corticola, 2′, sum., crim. (*syn.* ionema).
longipes, 2′, win., sc. (*syns.* guilleminiana, Columnea grandiflora and C. splendens).

NEMATOID WORMS.

The minute animals referred to under this general title are better known to gardeners as Thread- or Eel-worms. They are microscopic and translucent. Though their appearance is not well known to horticulturists, the effects they produce when attacking Cucumbers, Tomatoes, Clovers, etc., are all too well known. Some species attack the stems, while others appear to confine their attention to the roots of plants, and in the latter case galled or knotted roots are formed, the food supply is checked, the tissues decompose, and the plant collapses. The two genera of nematoid worms (Anguillulideæ) mostly affecting garden plants are Tylenchus and Heterodera. They are tenacious of life, vegetable poisons having apparently no effect upon them, and the ordinary extremes of heat and cold will not kill them. If in fodder plants consumed by animals, they pass unhurt into the manure and may thus be disseminated. Remedies for these pests are detailed under the plants most subject to their attacks.

NEMATUS.

The chief members of this genus of Sawflies (Tenthredinidæ) is N. Ribesii, unfortunately too well known to many gardeners and market growers as the Gooseberry or Currant Sawfly. Some other species that occasionally become serious pests are Baccarum, Salicis-cinereæ, ischnocerus, and vesicator, all of which raise galls on Willow leaves; and abbreviatus, which sometimes affects Apple and Pear trees. A few others attack Birches, etc. (*See* GOOSEBERRY SAWFLY for remedies.)

NEMESIA.

Annuals and hardy herbaceous perennials (*ord.* Scrophularineæ), which, with the exception of strumosa and its varieties, are not much grown in gardens. Seeds of the annuals may be sown either in heat in March and April and afterwards planted in the open, or seed may be sown in the open in May. The perennials should be divided in the spring. Any moist, fertile garden soil is suitable. Strumosa makes a good pot plant.

Principal Species :—

bicornis, 2′, Jy., hdy. ann., pur.
linearis, 2′, Ap. to Sep., hlf-hdy. per., ro. pur.
strumosa, 9″ to 18″, sum., hdy. ann., colours various, several vars.; compacta, wh., is good.

Other Species :—

chamædrifolia, 2, Je., hdy. per., pur.
cynanchifolia, 1, sum., hdy. per., bl., yel.
floribunda, 1′, sum., ann., wh.
fœtens, 2′, Je., hdy. per., pur.
versicolor, 1′, sum., ann., lil., wh.

Photo : Cassell & Company, Ltd.

NELUMBIUM SPECIOSUM.

NEMOPANTHUS. (MOUNTAIN HOLLY.)

A crimson berry-bearing, hardy deciduous shrub (*ord.* Ilicineæ). Propagation, by layers in autumn, or by seeds. Soil, peat, leaf mould, and sand.

Only Species :—

canadensis, 3′, My., wh. (*syns.* Ilex canadensis, I. delicatula, and Prinos integrifolius).

NEMOPHILA.

Pretty hardy annuals (*ord.* Hydrophyllaceæ). Seed can be sown in spring for summer bloom, or in autumn for flowering in spring, and treated as recommended for hardy annuals (which *see*). Cats are very fond of rolling on Nemophilas, and should be kept off by some protection, such as sharp-pointed sticks, among the seedlings.

Principal Species and Varieties :—

aurita, 1′, Je., pur. vio.
insignis, 1′, sum., spr., bl., wh. eye.
— alba, wh.
— grandiflora, bl., eye wh.
— marginata, bl., wh. edge.

— purpurea rosea, pur. ro.
maculata, 6″, sum., wh., spotted pur.
Menziesii, 6″, sum., wh., or bl., spotted darker colour. Vars. alba, maculata, etc. (*syn.* atomaria).
parviflora, 1′, sum., bl.
phacelioides, 1′, sum., bl., eye wh.

Nepenthes mastersiana (*see p.* 107).

NENGA.

This small genus of stove Palms (*ord.* Palmæ) is found in the Malay Peninsula, Java, and New Guinea. They are elegant, slender-stemmed subjects and attain a considerable height. Under cultivation they do best in comparatively small pots, in a peaty compost. Propagation is by seeds. The genus is not often cultivated in this country. Its chief members are sphærocarpa and wendlandiana.

NEOBENTHAMIA.

A singular, monotypic genus of Orchids (*ord.* Orchidaceæ), the only species having a slender, erect, reedy growth, the small but pretty flowers being borne at the apex. It succeeds if grown in peat and sphagnum, in a deep pot placed in a stove temperature. Water must be supplied at all seasons. Propagation is by division when new growth commences. This Orchid cannot be regarded as of special horticultural value.

Only Species :—

gracilis, 4′, aut., wh., spotted pur., yel.

NEODRYAS.

A group of three or four small South American Orchids (*ord.* Orchidaceæ), closely allied to Cochlioda, with the habit of an Oncidium. The same treatment as that accorded to the warmer Oncidiums will suit.

Principal Species :—

densiflora, 4″, sum., pur.

Nemostylis (*see Nemastylis*).
Neotinia (*see Habenaria*).

NEOTTIA (*syn.* Neottidium).

Terrestrial Orchids (*ord.* Orchidaceæ) that are of considerable interest, but not particularly beautiful or amenable to cultivation. The genus at one time included a large number of exotics, but the majority of these are now referred to Spiranthes, Goodyera, Physurus, and Macodes. The most important species is the Bird's Nest Orchid, a native of sheltered and close-growing woods in Great Britain and Ireland. It has sheathing scales instead of leaves.

Principal Species :—

Nidus-avis, 1′, early sum., brownish grey.

NEPENTHES.

A most interesting genus of handsome and popular stove evergreens (*ord.* Nepenthaceæ) that are grown for their peculiar and coloured pitcher- or urn-like leaf appendages, the flowers being insignificant.

Propagation. — By cuttings of one year old growths in a sandy mixture and placed in a propagating case with a temperature of 85° or 90°. Or by seeds sown on the surface of heavily drained pans of fibrous peat and sphagnum moss.

Soil.—One part sound, fibrous loam, two parts each fibrous peat and sphagnum moss, with some charcoal, broken crocks, and sharp sand. Perfect drainage must be provided.

Other Cultural Points.—The plants require a warm, moist atmosphere at all times, and abundant supplies of tepid water from March until October; they will require syringing daily during this period. Through the autumn and winter less watering is necessary, but the temperature must not fall below 60°. Re-basketing should be carried out in February. Better pitchers are produced by stopping the shoots after five or six leaves have been made.

The following descriptions refer only to the pitchers.

Principal Species and Varieties :—

albo-marginata, 10″ long, grn., red, wh. ring at mouth.
Burkei, contracted at centre, light grn., red markings, very fine.
Curtisii, 8″ long, tapered at base, grn., spotted and blotched crim. pur.; the var. superba is a splendid plant with a richly coloured broad rim.
— hookeriana, long drooping lvs., grn., spotted crim.
madagascariensis, small, crim., creamy throat.
northiana, 10″ long by 3½″ broad, bright grn., spotted pur.; one of the finest species.
rafflesiana, yellowish grn., spotted reddish br.; insignis and nigro-purpureaare distinct forms.
Rajah, 1′ long, very broad, dull pur. The largest and one of the rarest of Pitcher Plants.
sanguinea, 8″ long, bright blood red.
Veitchii, 10″ long, cylindrical.
ventricosa, 8″ long, contracted at centre, grn., flushed red, broad reddish br. rim.
villosa, 10″ long, broad, grn., spotted red; a rare species.

Principal Hybrids :—

amesiana (rafflesiana × hookeriana), grn., spotted crim.
atrosanguinea (hirsuta × Sedeni), crim., spotted yellowish grn.
balfouriana (mastersiana × mixta), red, splashed crim., spotted grn.
Chelsoni (Dominii × hookeriana), grn., spotted deep red.

Neottopteris (*see Asplenium*).

coccinea (hookeriana × Phyllamphora), crim., spotted yellowish grn.
Courtii, dull grn., spotted red.
dicksoniana (rafflesiana × Veitchii), grn., spotted and splashed crim, very large.
Dominii, dark grn., sparsely spotted red.
hybrida maculata, dark grn., spotted and splashed reddish pur.
intermedia, grn., spotted red.
mastersiana (sanguinea × distillatoria), wine crim., very free, good habit (*see p.* 106).
mixta (Curtisii × northiana), yellowish grn., marked red and crim.
Morganiæ (hookeriana × Phyllamphora), bright blood red with light mottlings of pale grn.
outramiana (Sedeni × hookeriana), yellowish grn., spotted dark red.
rubro-maculata, yellowish grn., spotted reddish pur.
Sedeni, light grn., speckled dull crim.
Sir W. T. Thiselton Dyer (mixta × dicksoniana), grn., pur., very large.
Tiveyi (Veitchii × Curtisii superba), pale grn., blotched and striped crim.
Williamsii (Sedeni × hookeriana), dull grn., overlaid with dense speckling of bright red.
wrigleyana (Phyllamphora × hookeriana), light grn., spotted crim.

Other Species and Hybrids :—

ampullaria, light grn.
bicalcarata, very broad, grn., two spurs at back of neck.
cincta, grn., shaded red, blotched pur.
cylindrica (Veitchii × hirsuta), pale grn. spotted crim.
distillatoria, grn.; the var. rubra has deep red pitchers.
dormanniana, grn., heavily marked crim.
edinensis (rafflesiana × Chelsoni), grn., red.
formosa (Chelsoni × distillatoria).
henryana (hookeriana × Sedeni), red, grn.
hirsuta, red., grn.,
khasiana, grn., pur.
lanata, dull grn.
o'brieniana, greenish red.
Phyllamphora, grn. yel.; a strong grower.
ratcliffiana (Phyllamphora × hookeriana), grn., spotted red.
robusta (hookeriana × Phyllamphora), yellowish grn., spotted red.
rufescens, (hirsuta × Courtii), grn., red.
stenophylla, grn., marked reddish pur.
Stuartii (Phyllamphora × hookeriana), light grn., marked crim.
superba (hookeriana × Sedeni), grn., speckled red.
Veillardi, grn., deep red.
Wittei, grn., marked crim.

NEPETA. (Cat Mint.)

Hardy herbaceous plants (*ord.* Labiatæ), many of which are weeds. Increase is by seeds sown in light soil in early spring, division in spring, or by cuttings under a hand-light in summer. Any garden soil suits, but especially a light or limy medium. Glechoma variegata is an elegant basket plant.

Principal Species and Varieties :—

Glechoma, 1′, spr., bl. (*syns.* hederacea and Glechoma hederacea). There is a ro. coloured form, and also one with prettily variegated foliage. Ground Ivy.
longiflora, 2, Jy., vio.
Mussini, 2′, sum., vio.
Nepetella, 1′, Jy., red.
spicata, 1′ to 3′, Sep., pur., wh.
violacea, 2′, Aug., bl.

NEPHELAPHYLLUM.

It is not often that these low-growing terrestrial Orchids (*ord.* Orchidaceæ) are seen outside botanical collections, for though very interesting they are not showy. They are stove plants with more or less creeping stems, and will grow under conditions as advised for Anœctochilus (which *see*). The leaves are ornamental, clouded, rather than decidedly variegated.

Principal Species :—

cristatum, 10″, sum., grn., pur., wh.
pulchrum, 6″, sum., grn., br., yel.
scapigerum, 5″, sum., yel., pur. br.

NEPHELIUM.

Stove evergreen, fruit-bearing trees (*ord.* Sapindaceæ), notable for producing the well-known fruit Litchi or Lychee. Propagation, by seeds in spring, layers, or cuttings of half ripened wood beneath a bell-glass over bottom heat. Soil, three parts fibrous loam and one part leaf mould, with sand.

Principal Species :—

Litchi, 15′, My., wh.
longana, 20′, My., wh.

NEPHRODIUM.

Description.—Judged by the many species (over 300) which it contains, and by the number of decorative plants it holds, the genus Nephrodium (*ord.* Filices) is an important one in the family of Ferns. It has a wide geographical distribution, and hardy, greenhouse, and stove species are all included. Many are easy of culture, and most of them have been so plastic in the cultivator's hands, that numbers of garden varieties have been yielded. One species alone, Filix-mas, counts its varieties by the score. There is a fair amount of variation in the size and cutting of the fronds. The inclusion

Nephrodium decompositum (*see p.* 108).

of Lastrea has swollen the ranks of Nephrodium considerably, and Arthropteris (in part), Camptodium, Dryopteris, Pleocnemia, Sagenia, Pachyderis, Phlebigonium, Podopeltis, Profera, and Pycnopteris are also assigned here.

Propagation.—By spores in all cases. These are abundantly produced, and germinate with

Nephrandra (*see Vitex*).
Nephranthera (*see Renanthera*).

freedom. A great many of the crested forms do not come true from spores, and so further variation of the type is obtained. All the species with creeping rhizomes may be increased by division, preferably in early spring. Such useful pot plants as lepidum, molle, m. corymbiferum, decompositum, and canum should be propagated frequently—lepidum because after two or three years the plants get worn out and sickly, and the others because in their mature stages they are too coarse to be useful. Rather firm potting and small pots are advised. Free drainage.

Soil.—For the pot plants a mixture of loam two parts, peat two parts, cow manure one part, and

NEPHRODIUM DECOMPOSITUM GLABELLUM.

one-sixth of the whole sand, will be found suitable. For the plants in the outdoor fernery plenty of humus is needed.

Other Cultural Points.—The chief insect pests attacking the pot plants are snowy fly and thrips, and light fumigations and careful sponging are the specifics. Plenty of water is needed at all times, and, during the growing season, liquid cow manure. (For details as to the management of hardy Ferns, *see* FERNERY.) Molle and m. corymbiferum are favourite market plants, hispidum and decompositum glabellum do well in Wardian cases, erythrosorum makes a good dwelling-room plant, and montanum thrives if planted upon the rockery. Cristatum likes a boggy situation and a peaty soil, when it will grow fairly well for two or three years, after which young plants must be raised.

Principal Species and Varieties :—

[NOTE.—The dimensions given apply to the size of the fronds, except where otherwise stated. The height of the plant is usually a little more than the length of the fronds, as the height of the stipe is extra.]

æmulum, 1′ to 1½′ long, 6″ to 10″ broad, tripinnate, hdy. (*syns.* Fœnisecii and Lastrea recurva). Angustipinnulum and ramosum are vars. Hay-scented Buckler Fern.

Arbuscula, 1′ to 1½′ long, 6″ to 8″ broad, st. (*syn.* Hookeri).

boryanum, 6′ to 8′ long, 2″ to 3″ broad, fronds soft and papery in texture, grh., a noble species (*syns.* divisum and Lastrea divisa).

catopteron, 4′ to 6′ long, 2″ to 3″ broad, hairy, grh.

cicutarium, 1′ to 2′ long, elongated triangular, st., rare but beautiful.

cristatum, 1′ to 1½′ long, 3″ to 5″ broad, spear-shaped, not crested, hdy. (British), but rare (*syns.* Aspidium cristatum and Lastrea cristata). Clintonianum, floridanum, and uliginosum are vars. Crested Shield or Buckler Fern.

cuspidatum, 2′ to 3′ long, 8″ to 12″ broad, papery in texture, rootstock fleshy, grh.

cyatheoides, 2′ to 3′ long, 1′ or more broad, pinnate, grh., handsome, but rare.

decompositum, 1′ to 2′ long, 1′ broad, broadly triangular, soft, papery, grh., good portable decorative plant (*syn.* Lastrea decomposita, *see p.* 107).

— glabellum, smaller and more compact than type, grh. (*syn.* Lastrea glabella, *see* figure).

— Shepherdii, a pretty, finely cut var.

decursivo-pinnatum, 1′ long, 3″ to 4″ broad, grh. or hlf-hdy. (*syn.* Lastrea decurrens of J. Smith).

deltoideum, 2′ long, 8″ broad naturally, smaller in cultivation, st. (*syn.* Lastrea deltoidea).

effusum, 4′ long, 2′ broad, leathery in texture, st., very handsome (*syn.* Lastrea deltoidea). Divergens is a var.

erythrosorum, 1′ to 1½′ long, 8″ to 12″ broad, papery, involucres red when young, grh. and hdy. (*syn.* Lastrea erythrosora).

— prolificum, a pretty var., bearing gemmæ.

Filix-mas, Male Fern, 2′ to 3′ long, 8″ to 12″ broad, hdy. (*syn.* Lastrea Filix-mas). A most variable and valuable species, of which there are almost innumerable vars. (For a selection of these, *see* separate list.)

floridanum, 1½′ to 2′ long, 6″ to 8″ broad, leathery, hdy.

fragrans, 6″ to 9″ long, 1½″ to 2″ broad, hdy. Fragrant Wood Fern.

glandulosum, 1′ to 1½′ long, 4″ to 6″ broad, papery, grh.

goldieanum, 2′ to 3′ long, 1′ broad, hdy. A noble North American Fern.

hispidum, 1′ to 1½′ long, 8″ to 12″ broad, triangular, leathery, dark grn., grh., excellent for Wardian cases.

inæquale, 1′ to 2′ long, 8″ to 12″ broad, soft, papery, grh.

lepidum, 1′ to 1½′ long, 4″ to 6″ broad, soft, grh. A remarkably elegant Fern, useful for table decoration (*see p.* 109).

leuzeanum, 4′ to 6′ long, triangular, stem stout, almost arborescent, st. (*syn.* Pleocnemia leuzeana).

macrophyllum, 2′ to 3′ long, 1′ or more broad, soft, papery, pale grn., st. Calvatum is a garden var.

molle, 1′ to 2′ long, 3″ to 10″ broad, soft, grh., st., habit tufted.

— corymbiferum, prettily crested.

— grandiceps, tips of fronds heavily crested; a pretty var.

montanum, 1½′ to 2′ long, 6″ to 8″ broad, soft, papery, hdy. (*syn.* Oreopteris). All the vars. below are hdy. also. Mountain Buckler Fern.

— Barnesii, fronds narrower than in type.

— coronans, crested at tips of pinnæ.

— cristatum, smaller, and crested, fragrant.

— nowellianum, narrow fronds and pinnæ.

— truncatum, pinnæ shortened.

patens, 2′ long, 8″ to 10″ broad, variable in size, texture thin but leathery, warm grh. and st. (*see p.* 110).

— cristatum, crested pinnæ.

pteroides, 2′ to 4′ long, 1′ or more broad, pinnate, soft, papery, bright grn., st.

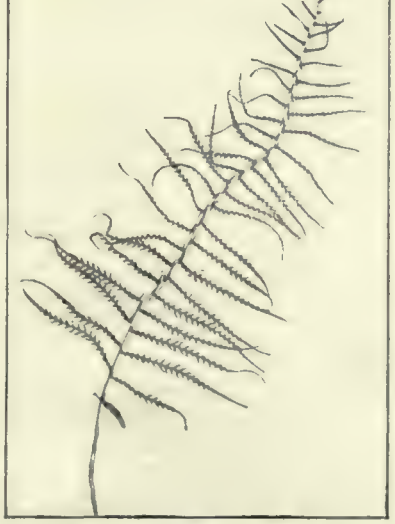
Richardsi, 1½′ to 1½′ long, 8″ to 9″ broad, grh. (*syn.* Lastrea Richardsi). Of little decorative value, and rarely cultivated.

— multifidum, 2′ long, 8″ broad, pale grn., drooping. One of the handsomest of Ferns, and a great improvement on the type.

rigidum, 1′ to 1½′ long, 4″ to 6″ broad, hdy., excellent for artificial rockwork; it likes chalky soils.
rodigasianum, 3′ to 4′ long, spreading, bipinnatifid, st.
Sieboldii, 1′ to 2′ long, 8″ to 10″ broad, leathery, pinnate, grh. or hdy. (*syns.* Lastrea and Pycnopteris Sieboldii).
— variegatum, a prettily variegated var.
sparsum, 1′ to 2′ long, 8″ to 12″ broad, papery, hard, light grn., grh. (*syn.* purpurascens of gardens).
— gracile, fronds spear shaped, bipinnatifid. The most elegant of the five vars. of the species.
spinulosum, 1′ to 3′ long, 6″ to 8″ broad, soft, papery, pale grn., hdy. A handsome, rather variable species. Prickly Shield Fern.
— dilatatum. By some authorities this is regarded as a species, but it is placed in *Synopsis Filicum* as a var. of spinulosum. 6′ long, 1½′ wide, dark grn., tufted, very variable, hdy., stem sub-arborescent. Of the many vars. that have originated, the undermentioned are some of the best:—
— dilatatum angustipinnulum, 1′, bipinnate, pinnules narrow.
— dilatatum Chanteriæ, 1′ to 2′ long, 8″ to 9″ broad.
— dilatatum crispum, pinnules curled.
— dilatatum cristatum, crested.
— dilatatum Dumetorum, 1′, pinnules undulating, dwarf.
— dilatatum grandiceps, handsomely crested.
— dilatatum Howardiæ, robust, pinnules forked and contracted.
— dilatatum ramosum, like Dumetorum, but more branched.
— dilatatum Stansfieldii, 8″ to 10″ long, 4″ to 5″ broad, leathery, pinnules curled, dwarf.
— dilatatum tanacetifolium, tripinnate, triangular.
Thelypteris, 1′ to 2′ long, 4″ to 6″ broad, thin, papery, light grn., hdy. Female Buckler Fern.
truncatum, 2′ to 4′ long, 1′ to 1½′ broad, tufted, soft, papery, grh. A noble Fern, but rare.
undulatum, 1′ long, 6″ to 8″ broad, like Adiantum Feei, st.
venustum, 2′ long, 1′ broad, soft, papery, st.
vestitum, 1′ long, 6″ to 10″ broad, soft, papery, bright grn., st. (*syns.* raddianum of gardens and Lastrea vestita).
villosum, plant 18′ high naturally, fronds 5′ to 7′ high, 2′ to 3′ broad, hairy, soft, papery, trunk arborescent, st. ev.

Other Species and Varieties:—

abortivum, 1′ to 2′ long, 6″ to 8″ broad, st.
abruptum of Presl (*see* truncatum).
albo-punctatum, 9″ to 12″ long, 4″ to 6″ broad, dotted over wh. spots, soft, dark grn., st. (*syn.* Arthropteris albo-punctata).
amboinense, close to molle, but fronds more papery, st.
aristatum (*see* Otaria).
articulatum (*see* penniger-um).
atrovirens (*see* decom-positum).
Blumei (*see* intermedium).
borneense, 1′ to 1½′ long, 4″ to 6″ broad, spear shaped, leathery, st. (*syn.* Lastrea borneensis).
brunonianum, 1′ to 1½′ long, 4″ broad, soft, papery, grh. (*syn.* Lastrea brunoniana).
calcaratum, 1′ long, 3″ to 6″ broad, st. (*syn.* Lastrea calcarata).
canum, 8″ to 12″ long, 3″ to 4″ broad, grh., close to molle, but slenderer.
chinense, 1′ to 1½′ long, 6″ to 9″ broad, soft, papery, grh.
chrysolobum, 6″ to 9″ long, 3″ to 4″ broad, dark grn. above, golden beneath, grh., pretty, but rare (*syn.* Lastrea chrysoloba).
confluens, 1′ to 1½′ each way, leathery, grh. (*syns.* Aspidium and Sagenia confluens).
coruscum (*see* Aspidium varium).
decurrens, 2′ to 4′ long, 1′ or more broad, leathery, st. (*syn.* Sagenia decurrens). Lastrea decurrens of J. Smith is decursivo-pinnatum.
denticulatum, 1′ to 2′ long, triangular, lower pinnules spiny, st.
deparioides, 1½′ to 2′ long, 8″ to 10″ broad, soft, papery, grh. (*syn.* Lastrea deparioides).
dilatatum (*see* spinulosum var.).
divergens (*see* effusum).
divisum (*see* boryanum).
eriocarpum (*see* odora-tum).
eusorum (*see* truncatum).
extensum, 2′ to 4′ long, 1′ to 1½′ broad, soft, papery, bright grn., st. or grh.
Fœnisecii (*see* æmulum).
funestum (*see* subquin-quefidum).
hirsutum of Don (*see* odoratum).
hirtipes, 2′ to 3′ long, 8″ to 15″ broad, tufted, dark grn., hdy. (*syns.* atratum and Lastrea atrata of gardens).
Hookeri (*see* Arbuscula).
hopeanum, 1′ long, 6″ to 7″ broad, leathery, st. (*syn.* Lastrea hopeana).
hudsonianum (*see* trun-catum).
incisum, 1′ long, ¾″ to 1½″ broad, leathery, st.
intermedium, 2′ to 3′ long, 1′ to 1½′ broad, grh. (*syn.* Blumei).
invisum, 1½′ to 2′ long, 8″ to 12″ broad, leathery, st.
irregulare (*see* latifolium).
Jenmani, 2′ long, 8″ to 12″ broad, bipinnate, st. (*syn.* Lastrea Jen-mani).
Kaulfussii, 1½′ to 2′ long, 6″ to 8″ broad, soft, papery, st.
latifolium, 2′ to 3′ long, 1′ to 1½′ broad, soft, papery, st. (*syn.* Sa-genia irregularis).
lawrenceanum, 2′ long, pinnate, st. (*syn.* Sa-genia lawrenceana).
lucidum, 1′ to 1¼′ long, 5″ to 6″ broad, st. Close to sophoroides.
mammilosum, resembles decurrens, st. (*syn.* Sa-genia mammilosa).
marginale, 1½′ to 2′ long, 6″ to 8″ broad, bipin-nate, leathery, dark grn., hdy. Half-way between Filix-mas and cristatum. Evergreen Wood Fern.
— elegans, more finely divided.
Maximowiczii, 1′ each way, deltoid, quadri-pinnatifid, parchment-like, grh.
nevadense, 1½′ to 3′ long, spear-shaped, thin, papery, light grn., grh. Sierra Shield Fern.
noveboracense, 1′ to 2′ long, 4″ to 6″ broad, grh. or hdy. New York Shield Fern.
odoratum, 9″ to 18″ long, deltoid, fragrant (*syns* eriocarpum and hir-sutum).
opacum, like erythrosor-um, but duller. A doubtful species.
Oreopteris (*see* montan-um).
Otaria, 1′ long, leathery, bright grn., grh. (*syn*



Nephrodium lepidum (*see p.* 108).

Lastrea aristata of gardens). The beautiful garden Fern known as Lastrea aristata variegata is really Aspidium aristatum variegatum.
pallidivenium, 2′ to 3′ long, 8″ to 12″ broad, leathery, st.
palustre, like montanum, but larger, grh.
Parishii, 6″ to 8″ each way, deltoid, parchment-like, warm grh. or st.
pennigerum, 2′ to 4′ long, 1′ to 1½′ broad, soft, papery, st. (*syn.* articulatum).
podophyllum, resembles Sieboldii, grh.
polymorphum, 2′ to 4′ long, 1′ to 1½′ broad, leathery, st., very variable (*syn.* Sagenia polymorpha).
prolificum (*see* erythrosorum var.).
pubescens, resembles decompositum, st. ev.
purpurascens (*see* sparsum).
raddianum (*see* vestitum).
recedens, 1½′ to 2′ long, 1′ broad, parchment-like, st. (*syn.* Lastrea recedens).
recurvum (*see* æmulum).
refractum, 1′ to 1½′ long, 6″ to 9″ broad, soft, papery, bright grn.,grh.
sanctum, 9″ long, 2″ broad, in tufts or rosettes, soft, papery, dark grn., st. (*syn.* Lastrea sancta).
scabrosum, 1½′ to 2′ long and broad, grh. (*syn.* Polypodium nigrocarpum).
Serra, 2′ to 3′ long, 1′ broad, light grn., st. (*syn.* Lastrea augescens).
setigerum, 1′ to 3′ long, soft, papery, grh. (*syns.* tenericaule and Lastrea setigera). Cristatum has crested fronds.
setosum, 1′ to 1½′ long, 6″ to 9″ broad, st. (*syns.* Aspidium setosum and Lastrea setosa).
simulatum, resembles Thelypteris (*syn.* Aspidium simulatum).
Sloanei, like patens, but larger (*syn.* Lastrea Sloanei).
sophoroides, 1′ to 2′ long, 6″ to 9″ broad, soft and papery, grh.
Standishii of gardens (*see* Aspidium laserpitiifolium).
subquinquefidum, 6″ to 18″ each way, soft, papery, dark grn., st. (*syns.* funestum, pilosissimum, and Vogelii).
subtriphyllum, 1′ to 1½′ long, 8″ to 12″ broad, deltoid, soft and papery, st. (*syns.* Aspidium subtriphyllum and Sagenia subtriphylla).
tenericaule (*see* setigerum).
terminans (*see* pteroides).
Thwaitesii, like deparioides, st. (*syn.* Lastrea Thwaitesii).
unitum, 2′ long, 6″ to 8″ broad, leathery, st. Glabrum, the Rounded Shield Fern, is a pretty var. with smooth fronds.
varium of gardens (*see* Aspidium varium).
Vogelii (*see* subquinquefidum).

Varieties of the Male Fern :—

A Selection :—

Countless varieties of the Male Fern are in existence, exhibiting a wondrous range of cutting, forking, cresting, and tasselling of the fronds. Many have received names. Very little difference is observable between some of these so-called distinct varieties, and when planted together they tend to discard the slight differences.

abbreviatum, 14″ long, curled, has been given specific rank as Lastrea Pseudo-mas.
— cristatum, 1′ to 3½′ long, crested.
Barnesii, 1½′ long, 3″ to 4″ broad.
Bollandiæ, 1½′ long, very broad.
crispum gracile, 8″ to 12″ long, crisped.
cristatum, 3′ long, 1′ broad, crested, dark grn.
— angustatum, narrow fronds.
— fimbriatum, lighter than cristatum.
dentatum, 3′ to 4′ long, very robust.
elongatum, 3′ to 4′ long, 2′ broad, quadripinnatifid.
foliosum, 16″ long.
furcans, 2′ long, pinnæ forked.
grandiceps, one of the largest of the crested vars.
Ingramii, 3′ to 4′ long, 1′ broad.
Jervisii, 4′ long, tasselled.
Mapplebeckii, 1′ long, crested.
multicristatum, like cristatum, but with more crests.
Pinderi, 2′ to 3′ long, erect.
polydactylum, 1′ to 2′ long, crested.
pumilum, dwarf, good for Wardian cases.
ramulosissimum, 4″ high, very pretty var.
Schofieldii, 3″ to 6″ long, pinnate.
variegatum.
Winstanleyi, 20″ long, 3½″ broad, pinnate.

NEPHROLEPIS.

Description.—A small genus (*ord.* Filices) in the number of species, but an important one from the cultivator's point of view, for it contains some of the handsomest and most easily grown Ferns. In all cases the fronds are a great deal longer than broad,

NEPHRODIUM PATENS (*see p.* 108).

and in most they are pendent in habit, so that the genus Nephrolepis is a very strong contributor to the list of basket Ferns. They luxuriate in plenty of heat and moisture, and the tough, leathery fronds are not at all averse from the syringing overhead which so many Ferns dislike.

Propagation.—By spores in a number of instances. This method, however, is of little use in the case of the crested and plumed varieties, which will not reproduce themselves from spores. Duffii also is barren, and can only be increased by division of the crowns. This should be done early in the spring, if possible, the divisions being potted up in equal parts of loam and leaf mould, with sand, and started in a close case, where bottom heat can be given. To propagate davallioides, d. furcans, and rufescens tripinnatifida, they should be knocked out of their pots and planted in a bed of fibrous peat, sphagnum, and sand, in a warm pit. They

will then send out rhizomes which will root into the soil, and these may be subsequently severed, and potted up to form separate plants. Bausei, cordifolia, c. philippinensis, and Pluma bear tubers which form a ready means of increase.

Soil.—Loam which has been stacked with cow manure for a year, three parts, leaf mould one part, one-sixth sharp sand, and a little charcoal. More leaf mould is necessary for young plants—about half of the bulk.

Other Cultural Points.—Most of the Nephrolepises are evergreen, and must therefore not be allowed to get dry. Bausei and Pluma are, however, deciduous, and should have less water during the winter. They will then start strongly in the spring. Snowy fly and thrips are the chief pests, and occasional sponging with soapy water, carefully done, is the best treatment. Duffii has too small fronds to sponge; it may be fumigated.

Principal Species and Varieties:—

[NOTE.—The dimensions relate to the fronds.]

Bausei, 1′ to 1½′ high, erect, "feathered" to base, st., garden var., deciduous.
cordifolia, 1′ to 2′ long, 2″ broad, st. or warm grh. (*syn.* tuberosa of gardens). Several handsome vars., of which the best are compacta, pectinata, philippensis (*syn.* philippinensis of gardens), and tuberosa of Presl. Produces tubers.
davallioides, 2′ to 3′ long, 10″ to 12″ broad, st. The handsomest of all. The fertile pinnæ are pinnatifid.
— furcans, 3″ to 4′ long, 7″ to 10″ broad, elegantly crested, st.
— furcans plumosa, much tasselled, st.
— multiceps, much forked, st.
Duffii, 1′ to 2′ long ½″, broad, pinnate, erect, tufted, st., best in pots.
exaltata, 1′ to 3′ long, 3″ to 6″ broad, st.
— hirsutella, coated with short, rusty hairs, st. (*syn.* hirsutula).
— neglecta, 1′ to 2′, st., good for rockery.
philippinensis, of Moore, 1′, narrow, erect, tufted, st., distinct from cordifolia var.
Pluma, 4′ to 5′ long, 4″ broad, pinnate, warm grh. A deciduous species. Produces tubers.
rufescens, 2′ to 3′, erect, st. The authors of *Synopsis Filicum* placed this as a var of acuta.
— tripinnatifida, 2′ to 3½′ high, 4″ to 6″ broad, erect, tripinnatifid, st., best in pots.

Other Species:—

acuta, 2′ to 4′ long, 8″ to 10″ broad, st. (*syns.*, in gardens, biserrata, ensifolia, platyotis, punctulata, and splendens).
biserrata (*see* acuta).
ensifolia (*see* acuta).
imbricata (*see* cordifolia).
neglecta (*see* exaltata var).
obtusifolia (*see* cordifolia).
philippinensis of gardens (*see* cordifolia var.).
platyotis (*see* acuta).
punctulata (see acuta).
recurvata of gardens (*see* exaltata).
ramosa, 6″ to 12″ long, 1″ to 3″ broad, st. (*syns.* oblitera and trichomanoides).
splendens (*see* acuta).
tuberosa (*see* cordifolia).
tuberosa of Presl (*see* cordifolia var.).
volubilis, a strongly twisting var. of exaltata.
zollingeriana, 1′ to 1½′ long, st.

NEPHROSPERMA.

A genus of stove Palms (*ord.* Palmæ) containing one species. This is van-houtteana, an elegant plant from the Seychelles, growing from 30′ to 35′ in height, bearing graceful, pinnate leaves. It thrives in loamy soil under similar conditions to other stove Palms, but is most useful when quite young.

NEPHTHYTIS.

Herbaceous plants from tropical Africa (*ord.* Aroideæ), of no horticultural value. A few species have been introduced. They have usually large leaves and inconspicuous inflorescences. A moist, hot stove is necessary for their culture, and they should have light, rich, loamy soil.

NEPTUNIA.

Herbaceous or sub-shrubby, water or swamp plants (*ord.* Leguminosæ). Oleracea (*syn.* plena) is the best known species. It is recognised by its prostrate, floating stems, doubly pinnate, sensitive leaves, and pale yellow flowers, which are borne throughout summer. It is increased by seeds or division, requires loamy soil, and needs a stove temperature.

NERINE.

Description.—Very beautiful greenhouse or almost hardy, bulbous plants (*ord.* Amaryllideæ), which are generally of easy cultivation, and are deserving of attention. They have brilliant flowers in umbels containing many blooms. A number of beautiful hybrids have been raised.

Propagation.—By offsets, removed when the plants are at rest, and by seeds sown under glass in a moderate heat in spring.

Soil.—Loam and leaf mould, with the addition of a little broken charcoal and some thoroughly decomposed cow manure.

Other Cultural Points.—The most popular of the genus is sarniensis, the Guernsey Lily, which should be potted as soon as received for flowering the same autumn. The others require to be rested when they have completed growth—generally from May to September. Afterwards they should be carefully watered and brought into a little heat. They may be plunged in a gentle hotbed to complete growth after blooming, which usually takes place in autumn or winter. Some may be treated as half-hardy bulbs in warm localities, and grown outside in a warm border close to a greenhouse or wall, and protected with litter in frosty weather. Nerines seldom need repotting, but an occasional top-dressing is helpful.

Principal Species and Varieties:—

curvifolia, 1′, Sep., sc.
— Fothergilli, brighter, more robust, and freer flowering.
flexuosa, 2′, Sep., pk. (*syn.* Amaryllis flexuosa).
— angustifolia, 2′, Sep., pk., lvs. narrow.
— excellens, 2′, Sep., rosy pk.
— pulchella, 2′, Sep., pk., striped red.
— Sandersoni, 2′, Sep., segments not so crisped.
sarniensis, 2½′, aut., salmon (*syn.* Amaryllis sarniensis). Guernsey Lily.
— corusca, 2½′, aut., or. sc. Vars. of corusca are insignis and pallida.
— Plantii, crim.
— profusa, Aug., sc.
— rosea, aut., rosy red.
— venusta, Sep., sc.
undulata, 1′, My., flesh.

Other Species and Variety:—

appendiculata, 2′, Sep., pk.
filifolia, 1′, Oct., red.
humilis, 1½′, Je., red.
— splendens, rosy car.
Moorei, 9″, sc.
pancratioides, 2′, wh.
pudica, 1½′, aut., wh., pk. (*see p.* 112).
pumila, 6″, sc.

Hybrids:—

Alleni.
amabilis.
atrosanguinea.
Camii.
cinnabarina.
Countess Bathurst.
elegans.
— alba, wh.
erubescens.
excellens.
Haylockii.
Lady Bromley.

Lady Clementina Mitford.	Lady Mary Shelley.	mutabilis.
Lady Dorington.	Mansellii.	Novelty.
Lady Lawrence.	Meadowbankii.	O'Brieni.
Lady Llewellyn.	Miss Jekyll.	Purple Prince.
Lady Louisa Longley.	Miss Willmott.	roseo-crispa.
Lady Lucy Hicks-Beach.	Mrs. Berkeley.	Spofforthiæ.
	Mrs. Douglas.	Stricklandii.
	Mrs. Godman.	tardiflora.
		— major.

close frame, or in bottles of water, and potted in light soil when rooted.

Soil.—Loam, a little peat, and some decayed manure.

Other Cultural Points.—The Oleander must have plenty of sun and light to ripen its growth in spring and summer. After blooming, the plants may be slightly pruned after reducing the supply

Photo: Cassell & Company, Ltd.

NERINE PUDICA (*see p.* 111).

NERIUM. (OLEANDER.)

Description. — Beautiful, but very poisonous, greenhouse shrubs (*ord.* Apocynaceæ), which are easily cultivated, and are very ornamental when in flower. They have showy, funnel-shaped flowers in flattish heads. Many of the forms of the common N. Oleander, popularly known as the Oleander, or Rose Bay, are very pleasing.

Propagation.—By cuttings of shoots just about maturity, inserted in sand under a bell-glass or in a of water, and then induced to make fresh growth before winter. Hard pruning is needed for big plants, which are apt to become straggly and unsightly. Repot in spring.

Principal Species and Varieties :—

coccineum (now Wrightia coccinea).	flesh; flore-pleno, semi-double.
odorum, 6′ to 8′, Je., pale red. Vars., carneum,	Oleander, 5′ to 14′, Je., bright red (*syn.* lauriforme).

Selection of N. Oleander Varieties :—

album plenum, double wh.
Felix Bourguet, ro., yel.
Henri Mares, rosy pk., double.
Madonna grandiflorum, cream.
M. Balaguier, pk.
Professor Duchartre, rosy pur.
Professor Durand, yel.
Sœur Agnes, double wh.
splendens, red, double.
variegatum, red, lvs. edged wh. or yel.

NERTERA.

Small, creeping, hardy, half-hardy, or tender herbs (*ord.* Rubiaceæ), of which only one, named below, appears to be in cultivation. Although reputedly hardy, it is not so everywhere, and may require the protection of a cold frame or greenhouse in winter. It is a neat little rockwork plant, creeping on the ground, and prized for its bright berries. Propagation, by division or by seeds sown when ripe under glass. It likes a sandy soil.

Principal Species :—

depressa, Bead Plant, Fruiting Duckweed, 1″ to 3″, berries or. red or sc.

NESÆA.

Annual or perennial herbs or sub-shrubs (*ord.* Lythrarieæ). Three or four species only are cultivated, and these not to any great extent. In some places they are hardy, but in cold, exposed places a cool greenhouse is necessary. Propagate by means of seeds or cuttings, and use ordinary garden soil.

Principal Species :—

salicifolia, 5′, sum., sub-shr., yel. (*syn.* Heimia salicifolia).
— grandiflora, much finer flowers.
triflora, 2′ to 3′, Aug., hlf-hdy. ann., bl.

NETTING.

Material made from string or wire, and used largely in gardens for the protection of fruit from birds, or for keeping rabbits and other animals from plants they would otherwise injure. For the protection of fruit, fish nets are the most suitable. If hung over fruit trees when in flower, they also provide a little protection against frost. For stopping rabbits, wire netting—with 1″ mesh or holes—2½′ wide should be provided. This should be let 6″ into the ground to prevent burrowing, and the upper portion securely fastened to stakes.

NEUROLÆNA.

Tropical or sub-tropical sub-shrubs (*ord.* Compositæ) requiring an intermediate house temperature. They have usually white or yellow flower heads, and are of little horticultural value. Any kind of garden soil suits them.

Principal Species :—

lobata, 2′, Je. to Jy., yel. (*syn.* Calea lobata).

NEUWIEDIA.

Stove terrestrial Orchids (*ord.* Orchidaceæ), allied to Selenipedium. They are stout, erect plants, with thick roots, large plicate (folded) leaves, and dense spikes of white or yellow flowers. Treatment similar to that given to Cypripediums is necessary.

Principal Species :—

Griffithii, 1½′, Sep., wh.
Lindleyi, 3′ to 4′, win., pale yel.

NEVIUSIA.

A hardy shrub (*ord.* Rosaceæ) from North America, having smallish, ovate leaves and white flowers. Cuttings root readily in June or July if given a little bottom heat, and ordinary garden soil is all it requires.

Only Species :—

alabamensis, 6′, My., wh.

NEWBOULDIA (*syn.* SPATHOTECOMA).

A small genus of trees from tropical Africa (*ord.* Bignoniaceæ), having alternate, deeply lobed leaves and large heads or panicles of pink or violet flowers. The genus is not in general cultivation. A mixture of loam and peat forms a suitable soil.

Principal Species :—

lævis, sum., ro. pur.

NEW ZEALAND SPINACH.

The correct name of this plant is Tetragonia expansa (*ord.* Ficoideæ). It is an annual found wild in Australia and New Zealand. It is grown solely as a vegetable, the young leaves being cooked and used in a similar manner to the common Spinach. Although inferior in flavour to Spinach, it has several advantages over that plant, as in hot summers it does not get "burnt up" so quickly, grows with greater vigour, and does not run to seed so fast. It may either be sown indoors in early spring, and the seedlings planted in rows 3′ apart—leaving 1½′ between the plants—in May, or it may be sown out of doors and thinned out to the same distance. Rich soil is essential, and the leaves should be gathered when young and tender.

NICANDRA.

A genus containing one annual herb (*ord.* Solanaceæ). This, physaloides, has membranous, deeply lobed leaves and blue flowers. It grows to a height of from 2′ to 4′; and the flowers, which are borne during summer, are followed by red, ornamental fruits. Seeds should be sown out of doors in April, in ordinary garden soil.

NICOTIANA. (TOBACCO.)

Description.—A genus (*ord.* Solanaceæ) of upwards of thirty half-hardy herbs, best known from one of the species, Tabacum, producing the tobacco of commerce. A number of the species make very fine plants for the garden if treated as half-hardy annuals and planted out in early summer. Alba, or affinis, sometimes stands the winter, or springs up again from the roots, and sylvestris seems nearly hardy. The sweet-scented species, such as alba (affinis), are welcomed under glass.

Nesopanax (*see Plerandra*).
Nettle, Hedge (*see Stachys*).
Nettle Mullein (*see Verbascum*)
Nettle, Stingless (*see Pilea*).
Nettle Tree (*see Celtis*).
Neumannia (*see Pitcairnia*).
Neurocallis (*see Acrostichum*).
Neurodium (*see Tænitis*).
Neuroloma (*see Parrya*).
Neustanthus (*see Pueraria*).

New Jersey Tea (*see Ceanothus americanus*).
New Zealand Bluebell (*see Wahlenbergia saxicola*).
New Zealand Flax (*see Phormium*).
New Zealand Bur (*see Acæna*).
New Zealand Laburnum (*see Sophora tetraptera microphylla*).
Nicker Tree (*see Cæsalpinia*).

Propagation.—By seeds sown in slight heat in February.

Soil.—Rich loam in a warm position.

Principal Species and Varieties :—

affinis (*see* alba).
alba, 3′, sum., per., wh. (*syn.* affinis).
colossea (*see* tomentosa).
sylvestris, 4′ to 5′, sum., the best.
Tabacum, 4′, sum., ro.
— macrophylla, pale red, rosy pur., car. red, lvs. large.
tomentosa, 9′ to 15′, sum., grh. or hlf-hdy., pk., wh. (*syn.* colossea, *see p.* 115).
— variegata, variegated lvs.

Other Species :—

acuminata, 3′, sum., wh., grn.
acutiflora, 2′, Je., wh.
Bigelovii, 3′, sum., wh.
fragrans, 4′, sum., grh., wh.
glauca, 15′, Aug., grh. shr., yel.
Langsdorffii, 5′, Aug., per., grn.
longiflora, 3′, Aug., wh.
noctiflora, 2′ to 3′, Aug., wh., pur. beneath.
— albiflora, wh.
persica, 3′, Aug., wh., grn.
rustica, 2′, Jy., yel., grn.
suaveolens, 2′, sum., wh.
wigandioides, sum., grh., yel. wh.

NIEREMBERGIA.

Description.—Very pleasing half-hardy or hardy annuals or perennials (*ord.* Solanaceæ) of herbaceous habit, which make good plants for rockwork or for growing in pots.

Propagation.—By seeds sown in a warm house in summer or early autumn, and by division or cuttings in spring.

Soil.—Loam, with some sand and well-decayed manure, or a little leaf soil.

Other Cultural Points.—All the Nierembergias like a good supply of moisture, and the hardy rivularis grows best if the pots are stood in pans of water. Slugs are very destructive to this species.

Principal Species :—

gracilis, 9″, sum., hlf-hdy., wh., streaked pur.
rivularis, 6″, Jy., hdy., creeping, wh.

Other Species and Varieties :—

aristata, 6″, Jy., ann., wh., pur.
calycina, 9″, Jy., hlf-hdy., procumbent, yel.
frutescens, 1½′, Je., hdy., bl.
— atroviolacea, 1′, hlf-hdy., dark vio.
— White Queen, wh.
linariæfolia, 6″, Jy., wh.
Veitchii, sum., grh., procumbent, lil.

NIGELLA. (Fennel Flower, Love-in-a-Mist, Devil-in-the-Bush.)

Description. — Curious, but attractive, hardy annuals (*ord.* Ranunculaceæ), with elegant foliage and pretty flowers, so surrounded by the foliage as to give rise to the name of "Love-in-a-Mist." Sativa is said to be the "Fitches" mentioned in Isaiah.

Propagation.—By seeds sown where the plants are to bloom, in March or April, and well thinned out.

Soil.—Any good garden soil.

Principal Species :—

damascena, 2′, sum., bl. or wh. A pretty plant.
— flore-pleno, double flowers.
hispanica, 2′, sum., deep bl., pur., or wh.

Other Species :—

ciliaris, 1′, Jy., yel.
corniculata, 1′, Jy., yel.
Garidella, 1′, Jy., br., grn. (*syn.* Nigellastrum).
orientalis, 1½′, sum., yel., red spots.
sativa, 1½′, Jy., yel.
— indica, bl.

NIGHT SOIL.

This is composed of human excrement, forming one of the richest, most powerful, and best of all manures. Its composition is generally carbonate of soda, sulphate of soda, ammonia, phosphate of magnesia, phosphate of lime, sulphate of potash, chloride of potassium, chloride of sodium, and phosphate of soda. The usual practice is to mix it with garden soil, adding lime to take away the offensive odour. After standing for several weeks, it may either be dug into the ground or used as a top-dressing. It is useful for almost all kinds of crops, especially those that are naturally fast growing.

NIPA.

This genus of stove Palms (*ord.* Palmæ) is composed of one species, fruticans, which is a rare plant with graceful, feathery leaves and a curious, creeping stem. Of the numerous Palms it is one of the most difficult to grow. At Kew it has been found to succeed best in loamy soil, with the lower inch of the pot submerged in the water of a warm tank.

NIPHÆA.

Stove herbaceous plants (*ord.* Gesneraceæ), with soft, hairy stems and leaves, white flowers, and creeping roots, requiring similar treatment to Achimenes (which *see*).

Principal Species :—

oblonga, 1′, win., wh.

NITRATES.

Though nitrogen is the most common gas, it is of no value to plants in a free state, and can only be of service when presented to the roots in combination with some mineral, *e.g.*, sodium nitrate, or, as it is more commonly known, nitrate of soda. Soluble forms of nitrogen are absolutely indispensable to plants of all kinds, but at the same time, they are readily washed out of soils containing no crops during winter, and during times of excessively heavy rains. Therefore land of a light, sandy consistency should be sown in the autumn with Mustard or Cole seed. The roots will prevent the nitrogenous matters from being carried away by drainage water, and in the spring, the plants will, if turned in, serve as an additional manure.

NITRIFICATION.

With the great advance during recent years in all branches of agricultural chemistry and botany, has come a knowledge of the changes taking place in manures when applied to the soil. The most important of these is that of nitrification, or the conversion of various nitrogenous animal and vegetable matters into such compounds of nitrogen as may be readily

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Nidularium (*see Karatas*).
Niebuhria oblongifolia (*see Mærua ovalifolia*).

Nightshade (*see Solanum*).
Nightshade, Enchanter's (*see Circæa*).
Nightshade, Malabar (*see Basella*).
Nightshade, Three-Leaved (*see Trillium*).
Niggers (*see Turnip Sawfly*).
Nigritella (*see Habenaria*).
Niphobolus (*see Polypodium*).
Niphopsis (*see Polypodium*).

utilised by the roots. With the exception of the roots of Leguminous plants, and certain forest trees, which, when growing in soils containing a large percentage of humus, have the assistance of saprophitic fungi, collectively known as microrhiza, no plants are able to use ordinary nitrogen. A group of bacteria is able to break up the nitrogenous compounds into nitrates, this process being termed nitrification. Certain conditions are necessary to enable the bacteria to carry on their work; these are (*a*) moisture, (*b*) heat, (*c*) oxygen and the presence of lime and some form of phosphorus, *e.g.*, phosphate of lime. Nitrates are always found more abundantly in soils after warm weather, as heat is essential for the increase of the bacterial organisms. This explains the slow decay of matter in soils during winter. Should the necessary conditions not be present, the bacteria are unable to flourish, and their place is taken by another group, closely related, which bring about the dissipation and waste of nitrogenous matter, known as denitrification.

Nitrifying organisms are far more abundant in deeply cultivated and well aërated than in shallow soils, hence the importance of thorough cultivation.

Under the name Nitragin cultures have been made of the various bacteria found in the root nodules of Leguminous plants. Soils deficient of these bacteria may have the solution containing the cultivated bacteria added when the seed is sown, as the cultures can be readily purchased in the form of glass tubes. It is necessary to sprinkle the mixture over the seed or distribute it in the drills.

NIVENIA (*syn.* PARANOMUS).

A genus of large, erect-growing, evergreen plants (*ord.* Proteaceæ), thriving in the greenhouse. Propagated by seeds and grown in a mixture of two parts peat and one part loam, with sand, and good drainage.

Principal Species :—

crithmifolia, 4′, Je., grh., pur. (*syn.* Protea Lagopus).

media, 2½′, Je., grh., pur. (*syn.* Protea spicata).

NOCCÆA.

Small, dwarf-growing, creeping or procumbent, hardy herbaceous plants (*ord.* Cruciferæ), suitable for the rock garden, or a front place in the herbaceous border. Propagation, by seeds, or division. Moist soil.

Photo: Cassell & Company, Ltd.

NICOTIANA TOMENTOSA (*see p.* 114).

Only Species :—

alpina, 3″ to 5″, spr. to aut., wh.

stylosa, 4″, sum., bien., wh. to lil. (*syn.* Iberis stylosa).

NOISETTIA.

Noisettia longifolia is a dwarf-growing stove evergreen tree (*ord.* Violarieæ), producing cream-coloured flowers of no great beauty

NOLANA.

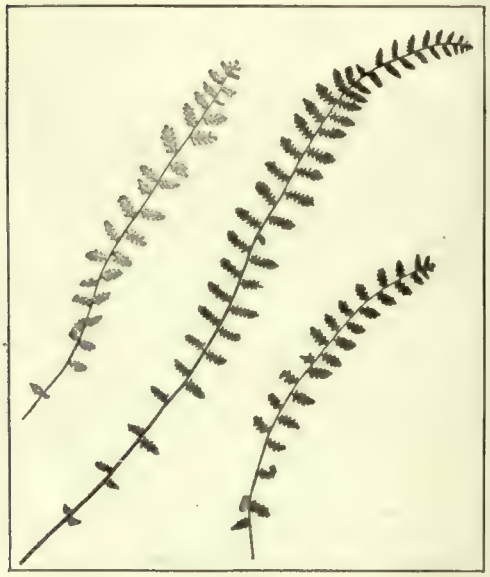
Annual or perennial, low-growing, often prostrate herbs (*ord.* Convolvulaceæ), sometimes with fleshy leaves. They may be propagated by seeds sown in

Nitta Tree (*see Parkia africana*).
Noble Liverwort (*see Anemone Hepatica*).

the open in April or early in May, and delight in an open, well-drained soil, in a sunny position, making very good subjects for seaside gardens.

Principal Species :—

atriplicifolia, 4″, sum., wh., yel. (*syn.* grandiflora).
lanceolata, 6″, Je., bl., wh., grn.
paradoxa, 18″, sum., wh.
prostrata, 3″, sum., pale bl.
tenella, 6″, sum., pale bl. (*syn.* paradoxa of *Botanical Magazine*).



Nothochlœna affinis (*see p.* 117).

NOLINA (*syn.* Beaucarnea).

A genus of greenhouse and half-hardy plants (*ord.* Liliaceæ). Propagation, by seeds and division. Soil, loam, leaf mould, and sand.

Principal Species :—

erumpens.
georgiana, 2′ to 3′, sum., wh.
hartwegiana.
recurvata, 2′ to 4′, wh., lvs. drooping (*syn.* Beaucarnea recurvata).

NONNEA.

Though upwards of thirty species are known, very few find favour with cultivators. The plants are annual or perennial herbs (*ord.* Borragineæ), requiring the same treatment as that given to Anchusa.

Principal Species :—

rosea, 6″ to 12″, sum., hdy. ann., ro., yel., throat wh. (*syn.* Anchusa latifolia).
— versicolor, red in the bud, changing to bl.

NOPALEA.

Plants (*ord.* Cacteæ) with succulent, leafless, green stems, similar in habit to many Opuntias, but differing in having erect petals and shorter stamens. They may be propagated by cuttings, and must be grown in loam, to which is added broken brick and old mortar rubbish with coarse sand and very good drainage. They like abundance of sun at all times, with plenty of water in summer, but little in winter.

Principal Species :—

coccinellifera, 8′ to 10′, sum., sc.; cochineal insects are reared on it (*syns.* Cactus cochenillifera and Opuntia coccinellifera).

NORANTEA.

Evergreen, stove, climbing shrubs with bright, showy flowers (*ord* Ternstrœmiaceæ). Cuttings of the mature shoots may be rooted in very sandy soil in a close case. Soil, peat and loam, with sand.

Principal Species :—

brasiliensis, 6′ to 8′, grn., wh., with sc. bracts.
guianensis, 10′, vio., large sc. bracts, supports itself with aërial roots.

NOTELÆA.

Greenhouse evergreen trees and shrubs (*ord.* Oleaceæ), closely related to the Olive. Propagation, by cuttings of side shoots in spring. Bottom heat should not be applied until the cuttings have commenced to form a callus. Soil, loam two parts, leaf mould one part, and sand.

Nothochlœna sinuata (*see p.* 117).

Principal Species :—

longifolia, 6′ to 8′, Mch. to Je., shr., wh., berries dark bl. (*syn.* Olea apetala).
ovata, Je., close to longifolia.
punctata, like longifolia, smaller fruit.

Nonatelia (*see Palicourea*).
Noli-me-tangere (*see Impatiens*).
None-so-Pretty (*see Saxifraga umbrosa*).
Nordmannia cordifolia (*see Trachystemon orientalis*).
Norfolk Island Pine (*see Araucaria excelsa*).
Normandy Cress (*see Cress, American*).
Nortenia (*see Torenia*).
Norway Maple (*see Acer platanoides*).
Norway Spruce (*see Picea excelsa*).

NOTHOCHLŒNA. (Gold and Silver Maidenhairs.)

Description.—A genus (*ord.* Filices) of exceedingly pretty stove or greenhouse Ferns. They are small, and for the most part of rather delicate appearance, requiring different treatment from the majority of Ferns. Naturally they grow in very exposed situations, but where plenty of moisture at the roots is available. It will be found that light, airy surroundings, such as they will obtain on a high shelf near the glass, and free drainage, and a regular supply of water, suit them perfectly; indeed, if not given these, they soon turn sickly.

Nothochlœna Marantæ.

Propagation.—By spores, most of which germinate freely. Division of the crowns in March and April—the latter month for the greenhouse forms—is also practised with a few.

Soil.—Fibrous peat and lumps of sandstone in equal parts. A few pieces of fibrous loam may be incorporated, but they are not necessary. A few nodules of charcoal are, however, an improvement.

Other Cultural Points.—In potting, elevate the crown of the plant a little above the surface. No water must be sprinkled over the fronds. Watch the crowns and the lower part of the stipes for scale, which, once established, is difficult to get rid of.

Principal Species :—

[Note.—The dimensions given refer to the size of the fronds.]

affinis, 4″ to 5″ long, 1″ broad, bipinnatified, st (*see p.* 116).

eckloniana, 6″ to 12″ long, 2″ to 3″ broad, tripinnatifid, grh.

Fendleri, tripinnate, grh. (*syn.* Cincinalis Fendleri).

flavens, 4″ to 9″ long, 2″ to 4″ broad, tripinnate, lower surface covered yel. powder, st. (*syns.* chrysophylla of gardens, and Cincinalis and Gymnogramme flavens).

Hookeri, 3″ across, stellate, lower surface covered wh. or or. powder, grh. Like Gymnogramme triangularis (*syn.* Cincinalis Hookeri).

hypoleuca, 4″ to 6″, bipinnatifid, grh.

lanuginosa, 6″ to 9″ long, 1″ to 1½″ broad, bipinnate, woolly, grh., wh.

Marantæ, 4″ to 12″ long, 1½″ to 3″ broad, bipinnate, grh. (*see* figure).

nivea, 3″ to 9″ long, 1½″ to 2″ broad, tripinnate, lower surface wh. powdered, grh. Hookeri of Lowe is a var.

Parryi, 5″ long, bipinnate, grh.

sinuata, 1′ to 2′ long, 1″ broad entire or pinnate, st. (*see p.* 116).

trichomanoides, 6″ to 15″ long, ¾″ to 1′ broad, pinnate, wh. powdered, woolly, st.; a beautiful basket plant.

Other Species :—

candida (*see* sulphurea).

chrysophylla (*see* flavens).

cretacea (*see* sulphurea).

dealbata, 3″ to 4″ long, tripinnate, wh. powdered, grh. (*syn.* Cincinalis dealbata).

distans, 6″ to 9″ long, ¾″ to 1″ broad, bipinnate, grh.

ferruginea, 6″ to 12″ long, ¼″ to 1″ broad, st.

Gilliesii (*see* squamosa).

Hookeri of Lowe (*see* nivea var.).

lævis (*see* sinuata).

mollis, 8″ to 12″ long, 1½″ to 2″ broad, tripinnate, warm grh.

Muelleri, st., covered with br. scales.

Newberryi, 3″ to 5″ long, covered wh. hairs, grh.
rufa (*see* ferruginea).
squamosa, 3″ to 4″ long, 1″ to 1½″ broad, grh.
sulphurea, 2″ to 3″ long and broad, covered wh. or yel. powder, grh. (*syns.* candida, Cheilanthes pulveracea, and Cincinalis sulphurea). Candida is a var.
tenera, 3″ to 6″ long, tripinnate, warm grh. (*syn.* Cincinalis tenera).

NOTHOSCORDUM.

Hardy and cool greenhouse bulbous plants (*ord.* Liliaceæ). Propagation, by offsets and seeds. Use light, rich, loamy soil.

Principal Species and Varieties :—

fragrans, 1½′ to 2′, sum., hdy., wh., lil., sweet (*syn.* borbonicum).
— inodorum, scentless.
macrostemon (*see* Milla macrostemon).
neriniflorum, 8″ to 9″, hlf-hdy., ro. pur. (*syn.* Caloscordum neriniflorum).
striatum, 6″ to 9″, My., hdy., wh. (*syn.* Allium striatum).
— striatellum, hlf-hdy., grn., yel.

NOTOSPARTIUM. (Pink Broom.)

Notospartium Carmichaeliæ is an interesting hardy or nearly hardy shrub (*ord.* Leguminosæ). Its green stems are nearly leafless, grow to a height of 20′, and produce small, pretty pink flowers in June and July. Propagation, by seeds and half ripened cuttings, in heat. Soil, loam and sand. A sunny position is best.

NOTYLIA.

Dwarf stove Orchids (*ord.* Orchidaceæ), of little beauty and seldom cultivated. The principal species are albida, brevis, bicolor, bipartita, Bungerothii, laxa, and punctata.

NOUELIA.

Nouelia insignis is a greenhouse or half-hardy tree (*ord.* Compositæ), with heads of white flowers, and leaves which are hairy on the under surface. Propagated by seeds and cuttings, using a light, loamy soil.

NUPHAR.

Description. — Nuphars are beautiful aquatic plants (*ord.* Nymphæaceæ) allied to the Nymphæas, and known to many from the native N. luteum, the yellow "Water Lily" or "Brandy Bottle" of many districts in Britain. They are hardy, and can be grown in ponds, tanks, or tubs with a few inches of soil, and from 6″ to 3′ of water over the root-stocks.

Propagation.—By division in spring or summer, or by seeds sown in autumn when ripe.

Soil. — Rich loam, with a little decayed cow manure.

Other Cultural Points. — The roots may be planted in shallow baskets, weighted with stones and sunk in the pond.

Principal Species and Varieties :-

Advena, Jy., yel. (*syn.* Nymphæa Advena).
luteum, Je., yel.
— kalmianum, Jy., yel.
minimum, Jy., yel.
— pumilum.
sagittæfolium, Jy., yel.

NURSERY.

A portion of the garden reserved for the raising of plants to take the place of existing ones in various beds, when their season of utility is over. By thus arranging a rotation, empty beds in the flower garden are avoided. Stocks of newer plants may also be increased in the nursery, wherewith to furnish other portions of the grounds when the plants have attained a suitable size. The term "nursery" is also applied to establishments in which plants are grown for commercial purposes.

NUTMEGS.

These are the seeds of Myristica fragrans (which *see*) after the berry has split, previous to the taking away, of the aril, or additional seed coat, which forms the "mace" of commerce.

NUTS.

Description. — Cobs, Cob Nuts, Filberts, and Hazel Nuts are fruits of two species of Corylus, Avellana and maxima, grown either for ornamental purposes or for the sake of their Nuts, or both (*see* Corylus). Cobs and Cob Nuts are terms originally applied to those fruits having a short cupule or husk, while Filberts are those with a husk much longer than the nut; but these distinctions have been broken down or linked together by intercrossing.

Propagation.—The best methods are by grafting in spring, and layering early in autumn. If rapid increase is desired, stocks may be raised from seeds and the varieties afterwards grafted upon the seedlings when strong enough.

Soil.—Nuts will succeed in almost any description of soil provided it is not waterlogged. A brown, calcareous loam is the best. Even in a stony and gravelly soil they give a good return, so that they may be planted where Apples and Pears would scarcely succeed. Elevated sites are preferable to low-lying ones.

Other Cultural Points.—Cob Nuts and Filberts should be grown in the form of bushes, and spur-pruned similarly to an Apple tree of the same form. The foundation of the bush may be laid by cutting the upright, primary stem of the layer to a point 1′, 2′, or 3′ from the ground. Several shoots will arise below the cut, and the three most conveniently disposed should be retained, shortening them at the winter pruning to 1′ in length. Retain two from each of these shoots, or six in all. A similar number from each of the six will give twelve in the third season, and this will be sufficient for bushes of moderate size. All supernumerary twigs should be spurred back to a good bud near the base at each annual pruning. The operator should always prune to a bud pointing in the direction he wishes the next season's growth to take, so that the twelve stems will form a cup-shaped bush. Many may be grown in small space, 6′ to 8′ in the row, but neither bushes nor branches should be allowed to become crowded. Another method is to grow them as standards and half-standards, pruning them in their early stages in order to lay the foundations of well balanced heads. After that they may be allowed to grow freely, merely thinning the branches where becoming crowded. Cosford and Pearson's Prolific Dwarf produce an abundance of male catkins, and should be planted amongst others to ensure the setting of the fruits.

Nottingham Catchfly (*see Silene nutans*).
Nunnezharia (*see Chamædorea*).

Nut, Ground (*see Apios tuberosa*).
Nutmeg, Californian (*see Torreya*)

Preservation.—When it is intended to preserve Nuts and Filberts till Christmas or after, they should be retained in the husks, the latter being dried to prevent mouldiness. If spread out thinly on boards in a dry, airy shed, shaded from the sun, the husks will dry without becoming brittle. They may then be stored in jars in a dry, frost-proof cellar. Nuts may also be stored in a dry loft, covered with straw to prevent their becoming desiccated.

Insect Pests. — The Nut Weevil (Balaninus Nucum) and the Nut Louse (Callipterus Coryli) are troublesome, particularly the former. The female Weevil pierces the young Nuts, laying one egg in each, giving rise to a grub that feeds on the kernel. Keeping the bushes properly thinned, and frequent stirring of the ground during summer, are good preventives. The trees should be gone over in the early morning, during egg-laying time, and the insects shaken down upon tarred trays. Burn all Nuts falling prematurely. Washes for trees infested with the Nut Louse are 1 lb. of tobacco steeped in 4 gallons of hot water, adding ¼ lb. of soft soap; and ½ lb. of soft soap in 4 gallons of water. One of these should be used at the commencement of the attack. Clean water, at that stage, applied forcibly with the garden engine, would check or destroy the young colonies of the insect.

Principal Varieties:—

Bergeri, a prolific Cob.
Cosford, good flavour, thin shell.
Kentish Cob, prolific, best market var.
Pearson's Prolific Dwarf, very prolific.
Prolific Filbert, fine flavour, crisped husk, pretty.
Purple Filbert, lvs. and fruit pur.
Red Filbert, kernel red skinned.
Webb's Prize Cob, large, handsome bunches.
White Filbert, kernel white skinned.

Other Varieties:—

Atlas Cob, very large Nuts.
Duke of Edinburgh, fine flavour, shell thick.
Merveille de Bollwyller, prolific, shell thick.
Prolific Cob, large and free.
True Kentish Filbert, best flavour, shy bearer.

NUTTALLIA.

A genus of two species (*ord.* Rosaceæ), including cerasiformis, 8′ to 12′, a hardy, white-flowered shrub, flowering in March and April. It is of considerable value, owing to the decorative pendulous spikes which are produced by the male plants. Propagation, by cuttings. Soil, rich loam. Afford some protection to the flowers from spring frosts.

NUYTSIA.

Nuytsia floribunda is related to Loranthus (*ord.* Loranthaceæ), but is terrestrial, not parasitic.

NYMPHÆA MARLIACEA CHROMATELLA (*see p.* 121).

Propagation, by seeds. As yet the plant has not been successfully cultivated in this country,

Only Species:—

floribunda, 10′ to 30′, spr., sum., or.

NYCTANTHES.

A fragrant stove tree (*ord.* Oleaceæ) of considerable beauty, known throughout India as the Tree of Sadness. Propagation, by cuttings of half ripened shoots in a close case in early summer. Soil, peat and loam in equal parts, with sand.

Only Species:—

Arbor-tristis, 12′ to 18′, Je., Aug., wh., fragrant.

NYCTOCALOS.

Stove climbing shrubs (*ord.* Bignoniaceæ), of which only one species has yet been introduced. The flowers open early in the evening and fall at

Nuttallia of Barton (*see Callirhoë*).
Nyctago of Jussieu (*see Mirabilis*).

the approach of day. Propagation, by cuttings. Soil, loam and sand, with some pieces of sandstone. The plants are most satisfactory when planted in a well-drained border.

Principal Species :—

Thomsoni, 12′ to 25′, sum., wh.

NYMPHÆA. (WATER LILY.)

Description.—A genus of magnificent and most desirable aquatic plants (*ord.* Nymphæaceæ), which are increasing in favour, largely owing to the introduction of the new hardy hybrids raised by M. Latour-Marliac and others, and which have given colours hitherto unknown among the hardy Water Lilies. Several new, tender varieties and hybrids of great beauty have been introduced also, and there is every likelihood that the cultivation of these indoor Nymphæas will be largely extended. Their handsome leaves and exquisite flowers render them ornaments to any garden, whether they are grown in the open or in tanks under glass. The smaller Nymphæas, such as ellisiana, and the Laydekeri, odorata, and tetragona forms, may be grown in tubs.

Propagation.—By division in spring or summer. A small portion of the rootstock with a bud will soon make a good plant with ordinary care. The rootstock should be cut with a sharp knife. Also by seeds, sown either when ripe or in spring in small pots of soil sunk in water and placed in a warm house.

Soil.—Rich loam, with the addition of some well decayed manure, is the most suitable for the Nymphæas.

Other Cultural Points.—Generally speaking, the treatment recommended for other aquatic plants, which will be found under the title AQUATICS, will suit the Nymphæas. The stove species may have a water temperature of about 75° while in growth and 60° in winter, and the house may have from that temperature to one 10° less.

Principal Species and Varieties :—

Hardy :—

alba, sum., wh. Common Water Lily.
— candidissima, very fine.
— rosea, ro.
— sphærocarpa rosea, pk.
nitida, Je., wh.
odorata, sum., wh., tinged red (*see p.* 121).
— minor, smaller.
— rosea, tinged pk.
tetragona, Je., wh.; a neat little species (*syn.* pygmæa).
— Helveola, yel.
tuberosa, Jy., wh.
— flavescens, yel.
— plena, double.
— Richardsoni, semi-double.
— rosea, pale ro.

NYMPHÆA MARLIACEA ROSEA (*see p.* 121).

Tender:—

Amazonum, grh., yellowish wh.
ampla, Jy., st., wh.
— speciosa, wh. or yellowish wh.
blanda, Jy., st., wh.
capensis, sum., bl. (*syn.* scutifolia).
elegans, Je., yellowish wh., bl.
flava, sum, hlf-hdy., yel.
gigantea, sum., grh. or st., bl.
gracilis, sum., grh. or st., wh.
Lotus, sum., st., red or wh.
— dentata, wh.
— devoniensis, deep red.
— monstrosa, wh.
— ortgiesiana, rosy red.
— rubra, red.
— thermalis, wh. (*syn.* thermalis).
mexicana, sum., hlf-hdy., yel.
— micrantha, Aug., st., wh.
parkeriana, sum., st., wh.
stellata, sum., nearly hdy., bl.
— capensis, grh. or st., bl.
— cyanea, bl.
— eastonensis, bl.
— purpurea, reddish pur.
— versicolor, wh., red, grn. (*syn.* versicolor).
zanzibarensis, sum., st., bl.
— azurea, azure bl.
— rosea, ro.

Hardy Hybrids :—

andreana, red, yel.
Arc-en-Ciel, salmon, lvs. parti-coloured.
Aurora, yel., passing to red.
caroliniana nivea, wh.
— perfecta, salmon red.
chrysantha, pale yel.
colossea, salmon.
ellisiana, clear red.

Nycterinia (*see Zaluzianskya*).
Nyctersition (*see Chrysophyllum*).
Nycterium (*see Solanum*).

WATER LILIES (NYMPHÆAS).

1. N. STELLATA BERLIN VARIETY, 2. N. STELLATA WM. STONE; 3. N. MARLIACEA ALBIDA: 4. N. GIGANTEA; 5. N. MARLIACEA ROSEA; 6. N. MARLIACEA CHROMATELLA; 7. N ELLISIANA.

fulva, bright red.
gladstoniana, wh.
gloriosa, bright red, ro.
Jas. Brydon, ro. crim.
Laydokeri fulgens, amaranth.
— liliacea, lil., car.
— purpurata, pk., crim.
— rosea, pk.
lucida, pk.
marliacea albida, wh.
— carnea, pk.
— chromatella, yel., lvs. (*see p.* 119) marbled br.
— flammea, red.
— ignea, pur. red.
— rosea, pk. (*see p.* 120).
— rubro-punctata, pale red.
odorata exquisita, pk.
— rosacea, pale pk.
— sulphurea, yel.
— sulphurea grandiflora, yel.
robinsoniana, vermilion, yel.
sanguinea, red.
Seignoureti, yel., pk., red.
Wm. Doogue, red.
Wm. Falconer, red.

Tender Hybrids :—

boucheana, ro.
daubenyana, bl.
deaniana, ro. pk.
Eugenie, car. ro.
Jubilee, wh., pk.
kewensis, ro. red.
Mrs. C. W. Ward, ro. pk.
o'marana, ro. red.
pulcherrima, light bl.
smithiana, pk.
Sturtevantii, ro. red.
Wm. Stone, bl.

NYSSA. (Tupelo Tree.)

Hardy trees and shrubs (*ord.* Cornaceæ), producing small greenish white flowers. Though not of much value for their flowers, they should be included in all shrubberies of any size, for the great beauty of their autumnal tints. In this respect few plants can vie with them, for the colours range from vivid green to fiery scarlet, and the leaves remain in this condition for some time. Propagation, by seeds and layers. Plants seldom produce fertile seed in England. Soil, loam and sandy peat. A moist situation is best, as Nyssas are naturally swamp-loving trees.

Principal Species :—

aquatica, 30″ to 50″, Ap., My., wh.
capitata, solitary lvs. large, hairy. Ogechee Lime (*syn.* candicans),
sylvatica, 30′ to 40′, flowers in pairs (*syn.* multiflora).
tomentosa (*see* aquatica).
uniflora (*see* aquatica).

OAK.

A popular name applied to the large genus Quercus. The common Oaks are of much value as timber trees, and for landscape effects, imparting an almost unique appearance to the country. Most of them are too large for ordinary garden purposes, and must be relegated to the park and forest, but the varietal forms and some of the ornamental, exotic species, such as the Holm Oak, Quercus Ilex; the Mossy or Prickly Cupped Oak, Q. Ægilops; the Chestnut-leaved Oak, Q. castaneæfolia; the Turkey Oak, Q. Cerris, and its cut-leaved form laciniata; the Red Oak, Q. rubra; and the Cork Oak, Q. Suber, should find a place in all extensive gardens. (For species and varieties, *see* Quercus.)

OAK GALLS.

Oak Galls, or Oak Apples as they are more popularly designated, are the result of a special effort on the part of the trees that bear them to cover up an injury. The injury is a puncture made by the sharp ovipositors of certain Gall Flies (Cynipidæ); this puncture is made by the female, and in it eggs are laid which soon develop into grubs. The irritation set up gives a wonderful stimulus to the formation of plant tissue, and more wonderful even than this is the fact that the growth forms galls varying in form and size in such a way that it is possible to determine the species of fly that made the puncture, by an examination of the gall. The insects emerge at various times, but it may be taken as a general rule that the sexual forms emerge from the summer galls about June or July. Fortunately the galls do not seriously distress Oak trees, and it is not often necessary to take preventive measures. Plucking and burning the fresh and unhardened galls would, of course, materially reduce subsequent attacks. Owing to the presence

Photo : C. R. Bick.

Nymphæa odorata (*see p.* 120).

of tannic acid in many of the larger kinds of galls, these abnormal growths have a distinct commercial value, and enter into the manufacture of ink and leather.

The principal galls and insects are the Cherry Galls on Oak leaves (Cynips Quercifolii); Oak Apples, or King Charles' Apple (Andricus terminalis); Silk Button Gall (Neuroterus numismatis); Oak Spangles (Neuroterus lenticularis); Currant Gall (Spathegaster Baccarum); Devonshire or Marble Gall (Cynips Kollari); and the Ink Gall (Cynips tinctoria), the last produced on the Levantine Oak, Quercus Ægilops. Oak galls are formed on the leaves and twigs, and sometimes on the roots.

OAT (*see also* AVENA).

The several species of Avena, known collectively as Oats, are all handsome Grasses, and the majority are of immense value to the human race, as the grain is extensively used for horse and cattle feeding, and among the poorer classes is in some countries made into bread. It also enters largely into the composition of some patent foods, while as oatmeal or rolled oats it is the basis of a nutritious breakfast dish that as "porridge" has for generations been extremely popular among the Scots.

OBERONIA.

A genus of about fifty low-growing epiphytes (*ord.* Orchidaceæ), chiefly natives of India and the Pacific Islands. The flowers are very interesting, the late Dr. Lindley remarking that in Oberonia "Pythagoras would have found a living evidence of animals transmuted into plants." A stove temperature suits. Increase is by division. A little peat and sphagnum placed about the roots, and the whole attached to a small block of wood or placed in a tiny Teak basket, will suffice in the way of potting.

Principal Species :—

miniata, 10″, sum., vermilion.
rufilabris, 6″, sum., yel. to red.
tahitensis, 8″, Jy., or. (*syn.* iridifolia of *Botanical Magazine* 4517, not of Lindley).

OCA.

This is the name given by the Bolivians to the tuberous and farinaceous roots of Oxalis tuberosa and O. crenata, which are largely employed as a food.

OCHNA.

Stove evergreen shrubs (*ord.* Ochnaceæ). Propagation, by cuttings in summer, in sand, beneath a bell-glass, over bottom heat. Soil, sandy loam and fibrous peat, with plenty of grit. In some species, and especially in multiflora, the black and crimson fruits are most attractive.

Principal Species :—

atropurpurea, 4′, spr., pur.
multiflora, 5′ to 6′, sum., yel.

OCHROCARPOS.

Stove trees (*ord.* Guttiferæ). Propagation, by cuttings of ripe wood in sandy peat, beneath a bell-glass, over bottom heat. Soil, fibrous loam and sand.

Principal Species :—

africana, 60′, sum., grn. (*syn.* Mammea africana)

OCHROMA.

Stove evergreen trees (*ord.* Malvaceæ), the wood of which is so light that it is employed for corks in the West Indies. Propagation, by cuttings in sand, beneath a bell-glass, over bottom heat. Soil, mellow loam and sand.

Principal Species :—

Lagopus, 30, My., wh.
tomentosa, 25′, My., wh.

OCHROPTERIS.

Stove Ferns (*ord.* Filices). The only species is pallens, 4′. Propagation, by division. Soil, three parts fibrous peat, one part loam, and coarse sand.

OCHROSIA.

Stove evergreen trees (*ord.* Apocynaceæ). They respond to the same treatment as Ochroma.

Principal Species :—

borbonica, 10′, My., pale yel. (*syn.* Cerbera borbonica and C. undulata).

OCIMUM.

Half-hardy annuals and shrubs (*ord.* Labiatæ). Propagation, by seeds sown under glass, or on a warm border out of doors in May. Any rich, deep soil suits. The only member of note in the genus is Basilicum, the common Basil (*see* Basil), and one of the most useful pot herbs.

Other Species :—

canum, 1′, Jy., grh., wh.
gratissimum, 4′ to 8′, Jy., grh. shr., wh.
sanctum, 1′, Jy., grh., pur. (*syn.* Lumnitzera tenuiflora).

OCOTEA.

Greenhouse trees (*ord.* Laurineæ). Propagation, by cuttings of ripe wood in sandy peat beneath a bell-glass. Soil, sound loam with coarse sand.

Principal Species :—

bullata, 15′, sum., grn. (*syn.* Oreodaphne bullata).
californica (*see* Umbellularia californica).

OCTADESMIA.

This genus (*ord.* Orchidaceæ) consists of about three West Indian species, all epiphytes. Propagation is by division. Sphagnum, fibrous peat, and broken crocks form a suitable potting mixture.

Principal Species :—

serratifolia, 6″, aut., wh., buff (*syns.* montana and Octomeria serratifolia).

OCTOMERIA.

Interesting little Orchids (*ord.* Orchidaceæ), closely allied to Pleurothallis. Warm greenhouse treatment, fibrous peat and sphagnum, and plenty of water at all seasons, are the chief cultural points.

Principal Species :—

diaphana, 4″, Ap., grn., yel.
graminifolia, 6″, My., wh., spotted red.
saundersiana, 6″, win., yellowish pur.
serratifolia (*see* Octadesmia serratifolia).
supraglauca, 3″, aut., grn., yel., pur.

Oak-leaf Geranium (*see Pelargonium quercifolium*).
Oak, She (*see Casuarina stricta*).
Oblonker Tree (*see Æsculus Hippocastanum*).
Ochranthe (*see Turpinia*).

ODONTADENIA.

Stove shrubs (*ord.* Apocynaceæ), of climbing habit. Propagation, by seeds and cuttings, both in a high temperature. Soil, fibrous loam and sand.

Principal Species :—

speciosa, 10′, aut., yel., or. (*syn.* Dipladenia Harrisii of *Botanical Magazine* 4825).

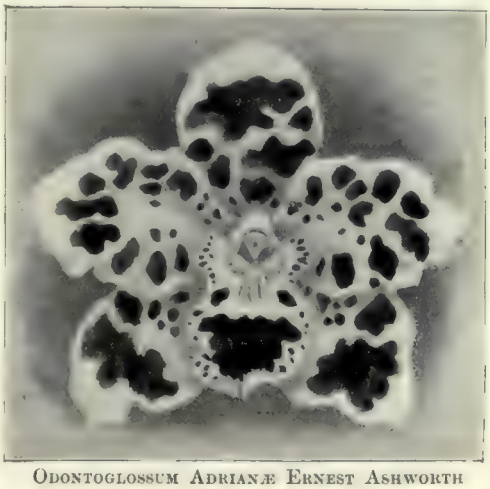
Odontoglossum crispum aureum (*see p.* 125).

ODONTOGLOSSUM.

Description.—Unquestionably the most popular genus of Orchids (*ord.* Orchidaceæ) is Odontoglossum, because, with very few exceptions, its various members can be successfully grown in a cool house, while many are very cheap, thus enabling amateurs and artisans to participate in the pleasures of Orchid culture and possession. Though not so large-flowered as Cattleyas, or so gorgeous, the Odontoglossums are bright, and have a stately grace and beauty which the former do not possess. The majority produce long, arching spikes on which the flowers are arranged in two rows; in some the spikes are branched, notably in nobile (Pescatorei), whereas in citrosmum they are pendulous. In Edwardi the spikes often reach a height of 4′, whereas in Rossii they scarcely exceed as many inches. The pseudo-bulbs may be quite short, or 8″ high, but in all cases they are compressed, so as to show two more or less acute edges; they are generally placed close together on a stout rhizome, though in the coronarium group they are wide apart. It is from the base of the bulb, just above the junction of the bracts, that spikes appear. The prevailing colours in Odontoglossums are white, yellow, and reddish brown, but purple, rose, and crimson are by no means wanting. The genus includes widely different forms, and, botanically, it seems to merge into Oncidium on the one hand and Miltonia on the other. Within the genus the species show a remarkable amount of variation, as is evidenced by the fact that the Royal Horticultural Society has granted awards and certificates to considerably over a hundred forms of the most popular of all Orchids—crispum. Grande is the largest flowered species, the blooms measuring about 6″ across, whereas in crispum the flowers rarely exceed 4″ and are generally 2½″ to 3″ across.

Distribution. — Odontoglossums are entirely American, and are found at varying altitudes from 5,000′ to 11,000′ on the mountains that extend along the western side, from Southern Mexico to almost the southern limit of Peru. The bulk of the popular species are found north of the Equator, above where the Andean chain breaks up into two ranges, and about where the eastern range again divides, part extending eastward to the coast of Venezuela. Crispum, however, does not extend so far north as some do, and is practically confined to a district extending 100 miles north and 100 miles south of the city of Bogota, associating with gloriosum, luteo-purpureum, lindleyanum, etc., towards its northern limit. Hallii and cirrhosum live nearer the Equator, while grande and its allies, though found as far north as Guatemala, are less Alpine than the Columbian species, and experience a wet and a dry season that must in some measure be imitated in our houses if they are to be successfully managed.

Hybrids and Seedlings.—When Odontoglossums were first imported in quantity it became apparent that there were wide variations from the recognised types, and efforts were made to refer these to certain species. Soon, however, it became evident that some forms could with equal reason be referred to two species, and a little further investigation showed that these were natural hybrids; but even now it is not perfectly known how much or how little influence one species has had upon another, as it is quite reasonable to presume that secondary and tertiary hybrids are numerous, and that even what are now regarded as extreme forms of a



Odontoglossum Adrianæ Ernest Ashworth (*see p.* 126).

species may have descended from a first hybrid, each succeeding generation being crossed with but one of the parent species, until the influence of the other original parent has been eliminated so far as leading specific characters are concerned. Now that success has been achieved in raising hybrid

Octomeria (*of D. Don, see Eria*).
Ocymum (*see Ocimum*).
Odontocarpa (*see Valerianella*).

Odontoglossums at home, more light will be thrown upon the interesting question of parentage. Pollination is easily effected, but a plant must be carefully tended if the seed pod is to ripen. Having ripened, it may contain unfertile seeds only, or there may be a small percentage of good seeds. Sow these on the compost in which a sturdy Odontoglossum of the same or an allied species is growing, selecting one that will not need repotting for some time to come, and subsequently watering it with the greatest care, or the very minute seeds will be washed away. The first sign of germination is seen in the formation of small, green, bulb-like bodies, and at this stage moisture must be regularly supplied, or failure will follow. When roots and tiny leaves appear, remove the seedlings, placing each one in a little peat and sphagnum in an Orchid thimble pot. Except that extra attention must be paid, the subsequent treatment after the second pseudo-bulb has formed does not differ materially from that given to the established parent species.

Cultural Requirements.—Formerly it was regarded as essential that the Odontoglossum house should be a lean-to, facing north, but, granted suitable ventilation, shading, and moisture, the plants will succeed if the aspect be west or south, or even if the house be span-roofed and running north and south. The disadvantage of the north aspect is that it deprives the plants of a large amount of light during autumn and winter. Double staging, as advised for Cattleyas, should be provided, with plenty of material, kept moist, on the lower one, so that at all seasons a moist atmosphere is insured. The house must be fitted with ample means of ventilation, at top and bottom; and the piping should be sufficient to keep up at least a minimum temperature of 45° without hard firing. With a few exceptions, hereinafter mentioned, Odontoglossums should never be allowed to become dry at the roots; indeed, not a few of the failures with the crispum group are due to lack of moisture during the winter, amateur growers frequently erring in this direction in their anxiety to avoid over-watering. The best time to pot Odontoglossums is when new roots are being formed, and as a general rule early September is a good time for the operation, as the plants, resenting interference during hot weather, have time to become re-established before winter arrives. The next best time is February or March. Avoid overpotting; a pot one size larger is usually an ample shift, but frequently the same size will do again, merely giving new material and a new receptacle, and at the same time removing useless back bulbs. Fill two-thirds of the pot's depth with clean crocks or cut bracken rhizomes; then place the plant in position, using a mixture of good peat and sphagnum about its roots, and making this moderately firm, but without pressing it down with the fingers, taking care that the bases of the pseudo-bulbs are kept higher than the pot rim.

Temperature and Ventilation.—Presuming that a house is devoted to Odontoglossums, the temperature should range from 45°, as the irreducible minimum during winter nights, to 70° during summer days. The latter will probably be exceeded during very hot, bright weather, in spite of shading, ventilation top and bottom, and damping all pots, paths, and staging within the house, as well as moistening the paths, etc., immediately around the house. As so many species are growing steadily during winter, it is most desirable that a temperature higher than "just sufficient to keep the frost out" should be maintained during that period. The aim should be 50° at night, with a fall of from 3° to 5° about 4 a.m. to 6 a.m. in severe weather, followed by a rise to 50° or 55° by midday, or even to 60° if the day be fine and ventilation increased. Except in foggy weather, the bottom ventilators should always be more or less open (only on the leeward side if cold winds prevail); they ought, of course, to be close to the hot-water pipes, so that the air is warmed as it enters.

Moisture and Shading.—When growing freely, or carrying spikes, Odontoglossums need much more water than when in a state of comparative rest, but at all times the amount must be regulated by the season and weather. Healthy plants can

Odontoglossum Souvenir de Victor Hye de Crom. (*see p.* 126).

hardly be overwatered during summer, and it will be frequently necessary to examine the collection twice a day to guard against drought. At this season an occasional overhead spraying will assist the plants, but syringing in the general sense must not be practised. Pathways, walls, and other surfaces, including the pots, ought to be moistened several times a day in summer to maintain the moist atmosphere so necessary to secure good results; in winter such damping need not be done more than twice a day, and even then the pots in which the plants are growing need not be moistened. For watering use rain water at the same temperature as the atmosphere in which the plants are growing. The lath blinds, so much in use on the Continent, provide the best means of giving shade, but whether these or canvas blinds are used, they must be kept 6″ above the glass by means of light

supports. These lath blinds are useful also in another way, for, if lowered at night during severe weather, they afford some amount of shelter, and thus reduce the need of fire heat—which the grower of cool Orchids considers a necessary evil. Canvas or mats hung round the glass sides of the house assist materially in the same direction. Such protection must be removed at dawn. Odontoglossums love shelter from bright sunshine, but, this granted, they love plenty of light. Heavily shaded plants do not show that bronzy purple hue on their fully developed leaves and pseudo-bulbs, which is the surest evidence of rude health.

Various Potting Materials. — The Bracken rhizomes, found so plentifully in peat, are, when cut small, taking the place of crocks in the potting of Odontoglossums, and with good results. Polypody fibre, the matted roots of Polypodium vulgare, was at one time suggested as a good substitute for, and an improvement upon, peat, but it has proved neither the one nor the other in this country. Quite recently leaf mould has been put forward as an ideal material in which to pot Odontoglossums, and many other Orchids. In Belgium and France it is extensively used, and with the best possible results, but the *terre bruyère* of the Continental growers must not be confounded with the ordinary leaf mould so widely used by British plantsmen ; it is rather to be compared with the elastic, spongy material that forms the floor of old Beech and Oak woods. This is cheap and also saves labour, as but few crocks are needed for drainage, and the larger bulk of vegetable matter used keeps the Odontoglossum roots moist, with less watering. In potting with leaf mould, the bases of the pseudo-bulbs should be ½″ below the pot rim, this allowing room for a surfacing of live sphagnum.

Some Special Points.—A few species require a distinct season of rest. Thus the group consisting of grande, Insleayi, schlieperianum, williamsianum, and their varieties, should only be grown in the cool-house during summer. Remove them to a Cattleya house early in the autumn, or, better still, treat them as intermediate house Orchids all the year round, and as soon as flowering is over, and the new bulbs have finished growth, gradually withhold water, giving hardly any during winter and spring. About May or June, when new growths and new roots appear, pot or top-dress as necessary, and water sparingly. Flower spikes appear at the base of new bulbs. Another species requiring similar treatment is the fragrant, pendulous-spiked citrosmum, which should be grown in pans and baskets suspended in the Cattleya (or similar) house. From the time growth is completed until the new growth and flower spike have simultaneously appeared, it should have only sufficient water to keep the pseudo-bulbs from shrivelling. Repot immediately after flowering. Such species as coronarium and londesboroughianum are rambling growers, and are best cultivated on a long raft or in a basket, suspended in an intermediate house. A few species, notably harryanum, Krameri, madrense, and Oerstedii, do best in a little higher temperature than the cool-house affords, as also do the hybrids having one of these as a parent. If the cool-house is part of a range of glass, it usually is warmer at one end than the other, and a careful observer will soon find that cirrhosum, Hallii, pardinum, etc., appreciate the warmer positions.

Diseases and Pests.—Of the former, those known technically as "spot" and "brown tip" (or yellow tip) come more properly under the heading of complaints than diseases ; the former is the result of excessive moisture, sodden compost, and the like, while the latter appears to be caused by too low a temperature. There are numerous pests, tiny slugs and snails being among the worst. These are best caught at night by the aid of a lantern, or they may be trapped in Lettuce leaves, etc. Protect young spikes by a ring of cotton wool. Thrips will appear if a moist atmosphere is not maintained ; sponging, and dusting with tobacco powder, are remedies. Light fumigation, or vaporising, at regular intervals, will answer for green fly, removing flowering plants during the operation.

Principal Species and Varieties :—

[NOTE.—The Kew authorities have been followed in compiling the lists of Odontoglossums.]

Alexandræ (*see* crispum).

apterum, 10″ to 15″, My., wh., spotted reddish br. (*syn.* nebulosum). Two very distinct vars. are candidulum, spotless ; and pardinum, richly spotted.

Bluntii (*see* crispum).

Cervantesii, 6″, spr., wh. or blush, with br. bars in concentric rings ; decorum and majus are fine forms.

cirrhosum, 1′ to 3′, spr., wh., spotted pur. ; hrubyanum is a faintly marked and klabochorum a richly spotted var.

citrosmum, 8″, My., wh. or pk., lip ro., yel. ; spikes depending 1½′ to 3′ ; flowers very fragrant ; the vars. album, roseum, and sulphureum are pretty colour variations.

coronarium, 1′ to 1½′, spr., glossy reddish br., marked yel.

— miniatum, denser habit, smaller and brighter.

crispum, 1′ to 2½′, spr., a most variable species, may be wh., ro., or even yel. tinted ; rarely unspotted ; usually spotted or blotched, with ro., crim., pur., br., chocolate red, or reddish pur. (*syns.* Alexandræ and Bluntii). A few of the finest and most distinct vars. are apiatum (flowers over 4″ broad), ashworthianum, augustum, aureum (suffused pale yel., *see p.* 123) Baroness Schröder, Cooksonii, dellense (br., yel.), Duke of York, Franz Masereel (grandly blotched blood red, crim.), Golden Queen (yel.), heliotropium (speckled br. on lil. ground), Lehmannii (spike nearly always branched), Luciani (fine reddish pur. blotches), mundyanum, nobilius, Oakfield Sunrise, pittianum, Prince of Wales, Princess Christian, purpurascens, Queen Victoria, Rex, roseum guttatum, Sanderæ (huge crim. blotches), sanderianum, schröderianum, Seraphim (pure wh.), Starlight, Stevensii (fine form, marked reddish br.), The Earl, Trianæ, veitchianum, Victoria Regina, virginale, Warneri, Wolstenholmiæ, and xanthotes (yel).

Edwardi, 2½′ to 4 , spr., deep pur., yel. callus on lip, fragrant ; a strong grower, with lvs. sometimes 2½′ long.

gloriosum, 2′, spr., yel., marked br., fragrant, spidery form.

grande, 8″ to 12″, aut., yel., shining reddish br., large, showy flowers, three to six on scape ; magnificum, pittianum, and Sanderæ are good forms.

Hallii, 1½′ to 4′, spr., variable, generally yel., chocolate red, lip yel. There are numerous beautiful forms, such as Edward VII., leucoglossum (wh. lip), magnificum, and xanthoglossum (deep yel. lip).

harryanum, 1½′ to 2½′, Ap., Je., sepals chestnut br., yel., petals yel., wh., pur., br., lip wh., pur., yel. ; the chief vars. are flavescens, Haywood's, and wilsonianum.

hastilabium, 2½′ to 5′, sum., yel., grn., spotted pur., br., lip wh., pur.

Kegeljani, 1½′ to 2½′, spr., pale yel., marked br. ; broad, rounded flowers (*syn.* polyxanthum) ; Gatton Park var. and

grandiflorum are the chief forms.

luteo-purpureum, 1′ to 3′, spr., early sum., variable, usually yel., heavily marked with reddish br.; lip yel., wh., reddish br. (*syns.* hystrix and radiatum). There are several magnificent vars., notably amesianum (light hued), cambridgeanum, leucoglossum, magnificum, Mossii, sceptrum aureum, vuylstekeanum (yel.), and vuylstekeanum maculatum).

maculatum, 1′ to 2′, spr., chocolate br., marked and tipped yel.; lip wh., spotted br. The finest vars. are anceps, donnianum, superbum, and thompsonianum.

nobile, 1′ to 2′, spr., wh. or blush, frequently spotted pur. or red; lip wh. or blush, generally spotted pur., and with yel. crest (*syn.* Pescatorei). There are numerous lovely forms, a selection being Duchess of Westminster, Jackson's var., Poë's var., Pollett's var., schröderianum, thompsonianum, veitchianum (splendidly marked reddish pur.), vervaetianum, and virginale.

Pescatorei (*see* nobile).

pulchellum, 8″ to 15″, spr., wh., with yel. disc on lip.
— majus, larger; both are very sweet scented.

Rossii, 6″, win., variable, wh. or ro., spotted br., lip wh. or ro. (*syn.* dawsonianum). Ehrenbergii is a neat and small var. Best vars.: albens, amesianum, majus, and rubescens.

Roezlii (*see* Miltonia Roezlii).

triumphans, 1½′ to 3′, spr. and early sum., variable, bright yel., marked rich reddish br., lip wh., marked br., yel. Best vars.: aureum (yel., or.), King Alfred, Lionel Crawshay, Raymond Crawshay, Rosefield var., and The Dell var.

Uroskinneri, 1½′ to 3′, spr., greenish yel., marked br.; lip, very large for size of flower, ro.
— album, lip wh.

vexillarium (*see* Miltonia vexillaria).

Principal Hybrids :—

Adrianæ, 1′ to 2½′, spr., sum., wh. or yel., spotted reddish br., natural hybrid (hunnewellianum × crispum), very variable, Arthur Ashworth, ashworthianum, Ernest Ashworth (*see p.* 123), Lady Wigan, Lord Roberts, rochfordianum, and venustum being a few choice forms.

andersonianum, 1′ to 3′, win., spr., variable, usually wh., marked reddish br. (*syn.* crispum, var. andersonianum), natural hybrid (crispum × gloriosum); a few fine forms are bogaerdianum, Cooksonii, jenningsianum, measuresianum, Mrs. de B. Crawshay, and pollettianum. Of the group that have rosy pur. flushed flowers and a clearer yellow lip, known as ruckerianum vars., the best are ruckerianum, crawshayanum, punctatissimum, rosefieldiense, and superbum.

Braeckmannii, 1½′ to 2′, sum., yel., marked dark br., lip wh., yel., br. (Hallii × harryanum); crawshayanum is a handsome form.

Cooksonii, wh., yel., br. (Hallii leucoglossum × crispum Cooksonii) (*syns.* crispo-Hallii and Hallio-crispum); crawshayanum and roseum are good forms.

Coradinei, 1½′ to 2½′, spr., yel., marked bright br., natural hybrid (lindleyanum × crispum); the choicest forms are crawshayanum, mirabile, Rosefield var., and splendens.

Denisoniæ, 1½′ to 3′, spr., pale yel., barred and blotched reddish br., lip pale yel., spotted reddish br., natural hybrid (crispum × luteo-purpureum), varying almost to the parental species on either hand (*syns.* Chestertonii and wilckeanum). A few of the finest forms are albens, Chestertoni, excelsum, Godefroyæ, Golden Queen, Lowii, Pittiæ, Pitt's var., Queen Empress. The first hybrid Odontoglossum raised artificially was leroyanum, which determined the parentage of the Denisoniæ or wilckeanum forms, and consequently is but one of them.

elegans, 1½′ to 3′, spr., yel., reddish br., or., natural hybrid (cirrhosum × cristatum, or Hallii); Pollett's and Sander's vars. are distinct and beautiful, while Eastwood Park var. is very elegant.

excellens, 1′ to 2½′, spr., sum., yel., wh., light br. or red spots, or. crest, natural hybrid, but also raised artificially (nobile × triumphans). A beautiful Orchid, its finest forms being chrysomelanum, harvengtense, Lowiæ, Prince of Orange, Rosslyn var., Sanderæ, and Thompsoni.

humeanum, 8″ to 12″, win., wh. or pale yel., marked reddish br., petals marked only at base, lip creamy wh., marked red or br.; natural hybrid (maculatum × Rossii) (*syn.* aspersum). Aspersum excellens, fulvidum, and roseum are good forms.

leeanum, 2½′, spr., deep yel., reddish br.; a beautiful and unique natural hybrid.

loochristiense, 1½′ to 2½′, spr., early sum., light yel., spotted br., base of petals wh.; lip wh., br. spot, yel. crest (crispum × triumphans). Kimberley, Canary Bird, and Coundon Court var. are pretty forms.

Mulus, 1½′ to 2½′, spr., variable, yel., blotched br.; natural hybrid (gloriosum × luteo-purpureum). Courtauldianum, germinyanum, and holfordianum are good forms.

Rolfeæ, 1′ to 2′, spr., early sum., variable, wh., spotted, blotched, and stained pur. A beautiful artificial hybrid (nobile × harryanum), flowers resembling harryanum in shape. Fine forms are ardentissimum, Meleagris, optimum, and Walton Grange var.

Souvenir de Victor Hye de Crom., 2½′, My., sepals and petals creamy wh., heavily barred pur. br., lip wh., vio. pur. A magnificent artificial hybrid (harryanum × luteo-purpureum, *see p.* 124).

spectabile, 1½′ to 2½′, spr., sum., creamy wh., blotched br., stained vio. pur., lip creamy wh., spotted pur., crest yel. (harryanum × crispum, *syns.* crispo-harryanum and harryano-crispum). Vivicans is a distinct var.

wattianum, 1½′ to 2′, sum., yel., blotched reddish br.; lip wh., shaded yel., crim. pur. blotch, stained vio. pur. at base. A rare natural hybrid lately determined artificially (harryanum × lindleyanum). Named forms are crawshayanum (artificial hybrid), Hardy's, and superbum.

wendlandianum, 1½′ to 2′, spr., creamy wh., shaded pur., blotched light br.; lip creamy wh., marked br.; natural hybrid (crinitum × crispum Lehmanni).
— crawshayanum is a more richly coloured form.

Other Species, Hybrids, and Varieties :—

angustatum (*see* ramosissimum).

aspersum (*see* humeanum var.).

aspidorhinum, 14″, aut., yel., br., wh.

bictonense, 15″ to 24″, aut., greenish yel., ro.; album and roseum are colour vars.

blandum, 9″, spr., wh., spotted pur.

cariniferum, 2′, aut., grn., br., yel.

Chestertonii (*see* Denisoniæ var.).

constrictum, 15″, win., yel., reddish br., ro. Sanderianum is a pretty form.

cookianum, natural hybrid (blandum × triumphans).

cordatum, 1½′, spr., br., yel., wh. (*syn.* Lueddemannii).
— of Hooker (*see* maculatum).

crinitum, 1½′, spr., win., yel., wh., br.

crispo-harryanum (*see* spectabile).

cristatellum, 1¼′, sum., yel., reddish br.

cristatum, 10″, spr., yel., br.

crocidipterum, 1½′, spr., sum., yel., br., wh.; fragrant.

dellense, natural hybrid (nobile × triumphans).

dicranophorum, natural hybrid (triumphans × lindleyanum).

donnianum (*see* maculatum var.).

elegantius, natural hybrid (nobile × lindleyanum).
epidendroides, 15″, spr., yel., br., pur., wh.
galeottianum, 6″, spr., wh., spotted red.
Hallio-xanthum, natural hybrid (Hallii × Kegeljani).
harryano-crispum (*see* spectabile).
harvengtense (*see* excellens var.).
hebraicum, natural hybrid, probably var. of andersonianum.
Hennisii, 1′, sum., yel., marked br.
Hinnus, natural hybrid (cirrhosum × cristatum).
hunnewellianum, 1¼′, spr., yel., marked dark br., lip wh., br.
hystrix (*see* luteo-purpureum).
Insleayi, 1′, Jy. to Sep., yel., br., crim.; leopardinum and splendens are fine forms.
jenningsianum (*see* andersonianum var.).
Krameri, 8″, sum., vio., wh., red; there is a wh. var.
læve, 2½′, spr., br., yel., pur.
Lindenii, 5′, spr., yel., grn. (*syn.* platyodon).
lindleyanum, 1′ to 2′, spr., yel., spotted br.; mirandum is a very distinct var.
londesboroughianum, 2½′, aut., yel., marked reddish br.
Lueddemannii (*see* cordatum).
madrense, 15″, spr., wh., pur. br., yel., fragrant.
maxillare, 10′, aut., wh., pur. br. spots.
measuresianum (*see* andersonianum var.).
miniatum (*see* coronarium var.).
mirandum (*see* lindleyanum var.).
nævium, 15″, sum., wh., spotted red.
nebulosum (*see* apterum).
odoratum, 1½′, win., yel., spotted reddish br., fragrant.
Oerstedii, 6″, spr., wh., yel., fragrant.
pardinum, 2½′, spr., pale yel., spotted reddish br., fragrant.
Phalænopsis (*see* Miltonia Phalænopsis).
polyxanthum (*see* Kegeljani).
ramosissimum, 3′, spr., wh., spotted pur. (*syn.* augustatum).
Reichenheimii, 3½′, spr., yellowish grn, barred pur. br. (*syn.* læve var.).
radiatum (*see* luteo-purpureum).
ruckerianum (*see* andersonianum var.).
sanderianum (*see* constrictum var.).
sceptrum (*see* luteo-purpureum var.).
schlieperianum, 1′, aut., yel., br., or.
tripudians, 2½′, spr., yel., reddish br., wh.
vuylstekeanum (*see* luteo-purpureum var.).
Wallisii, 1½′, spr., br., yel., pur.
Weltoni (*see* Miltonia Warscewiczii var.).
wilckeanum (*see* Denisoniæ).
williamsianum, 1′, sum., greenish yel., br., lip wh.

ODONTOSPERMUM.

Hardy annuals and perennials, and greenhouse evergreen shrubs (*ord.* Compositæ). Propagation, by seeds for the annuals, division or cuttings for the perennials, and cuttings for the shrubs. Soil, any fertile compost.

Principal Species :—

aquaticum, 6″, Jy., hdy. ann., yel. (*syn.* Bupthalmum aquaticum).
maritimum, 1½′, sum., hdy. per., yel. (*syn.* Asteriscus maritimus).
sericeum, 4′, Je., grh. ev. shr., yel. (*syn.* Bupthalmum sericeum).
stenophyllum, 3′, Je., grh. ev. shr., yel. (*syn.* Bupthalmum stenophyllum).

ŒCEOCLADES.

Orchids formerly described under this title are now referred to the genus Saccolabium, with one or two exceptions; falcatum is referred to Angræcum.

Odontoloma (*see Davallia*).
Odontonema (*see Thyrsacanthus*).
Odontosoria (*see Davallia*).
Œnoplea (*see Berchemia*).

ŒNOCARPUS.

Stove Palms (*ord.* Palmæ), allied to Areca. Propagation, by imported seeds, and suckers. Soil, mellow loam.

Principal Species :—

Bacaba, 50′. Bataua, 40′. minor, 12′.

ŒNOTHERA. (Evening Primrose.)

Description.—A genus of handsome border or rockery flowers (*ord.* Onagrarieæ), generally hardy perennials with large flowers. A few are annuals or biennials. "Evening Primrose" is a misnomer, as a number are day bloomers. (For the other annuals, *see* Godetia.)

Propagation.—By seeds, and the perennials by division also.

Soil.—Nearly all require a warm, dry soil.

Principal Species and Varieties :—

biennis, 3½′, Jy., bien., yel.
— grandiflora, yel. (*syn.* lamarckiana).
cæspitosa, 9″, Jy., wh.; a splendid species (*syns.* marginata and eximia).
fruticosa, 3′, Jy., yel.; a fine day-bloomer (*syn.* serotina of Sweet).
— Youngii, yel.; very free flowering.
— Youngii plena, semi-double.
glauca, 3′, Je., yel.
— Fraseri, 3′, Jy., yel.
— Fraseri M. Cuthbertson, double flowers.
missouriensis, 1′, Je., trailer, yel.
speciosa, 2′, Jy., wh. (*see p.* 128).
— rosea, 1′, Jy., pk.
taraxacifolia, 9″, Jy., trailer, wh.; tender (*syn.* acaulis).

Other Species :—

albicaulis, 9″, Je., wh.
anisoloba, 3′, My., wh.; shrubby stem, tender.
cardiophylla, 1′, sum., yel.
Drummondii, 2′, Je., bien., yel.
Johnsoni, 4′, sum., hlf-hdy. ann., yel.
linifolia, 1′, sum., yel.
Nuttallii, 6″, Je., wh. (*syn.* tanacetifolia).
odorata, 2′, My., bien., yel.
ovata, 3″, Je., yel.
pumila, 6″, Jy., yel.
Sellowii, 2′, Je., ann., yel.
tetraptera, 1′, sum., ann., wh.
— rosea, ro.
trichocalyx, 1′, Je., bien. or per., wh.
triloba, 6″, Je., per., yel.

OFFSETS.

One of the methods adopted by Nature for the continuity of species is the production of supplementary plantlets at the sides of, and closely attached to, the parent. This method ensures true offspring, as it is a purely vegetative process and quite independent of sexual reproduction, with its subsequent possibility of seminal variation. Bulbous plants form the most important group in which increase is naturally by offshoots, and it is entirely due to this that stocks of florists' varieties of Hyacinths, Tulips, Narcissi, etc., are kept true for practically any number of years with the utmost ease, and without that continual "rogueing" and selecting that is necessary to maintain varieties of florists' flowers raised only from seed. During the period of rest, offsets sufficiently large to start on their own account should be parted from the parent, and grown by themselves until they reach a flowering size.

Offset production is assisted when seed production is prevented. Highly bred and highly fed subjects, like the present race of Amaryllises or Hippeastrums, do not make offsets freely, owing to the great tax which the large inflorescence makes upon their energies, even provided no seed

is saved. Offset production may be increased artificially in some cases by scooping out the base of an old bulb, and this is taken advantage of in the case of Hyacinths which do not naturally give many offsets. By various other means also is offset production increased, as it has been found that some injury to the growing point affects bulbs somewhat as it does soft-wooded plants—it encourages basal shoots, and after all a bulbous offset is only a basal shoot from a compressed stem.

OFTIA.

Greenhouse evergreen shrubs (*ord.* Myoporineæ). Propagation, by cuttings of young growths in sand, beneath a bell-glass. Soil, loam, leaf mould, and sand.

Principal Species :—

africana, 3′, sum., wh. (*syn.* Spielmannia africana).

OÏDIUM.

This genus of fungi is one with which every gardener would rather not have any immediate acquaintance. The various species are capable of doing much damage to plant life, and appear as moulds, or rather as mildews; and wherever they settle down to an attack their presence is made manifest by a white, downy coating, consisting of a dense mass of minute filaments, or mycelium, from which in due course appear the tiny, cellular heads that, under suitable conditions, extend the species. Oïdium Tuckeri is the fungus known all too well as Vine Mildew, and it almost invariably follows a chill induced by improper or excessive ventilation in faulty houses. Vines are subject to attack whenever the weather imposes a severe strain or check upon growth. Chrysanthemums, Turnips, Grasses, Peas, and Peaches, are all more or less subject to mildews, but, fortunately, the attack is always superficial, so that remedies, properly applied, will generally relieve the plant infested, and prevent serious damage. There are two methods of curing these mildews; one is by dusting the affected parts with flowers of sulphur, and the other is by spraying with a weak potassium-sulphide solution, either of which will kill the mycelium, and not injure the host.

Photo: Cassell & Company, Ltd.

ŒNOTHERA SPECIOSA (*see p.* 127).

It is necessary to point out that although the Oïdiums are generally regarded as a distinct section of fungi, and, indeed, may so be considered horticulturally, yet each member is but a stage in the life cycle of a fungus that may be an Erysiphe or a Sphærotheca, but which cannot be determined until the perfect or fruiting stage is reached, and it is the fact that this stage is only reached under especially favourable circumstances that led to the use of the title Oïdium for species (then undetermined) that had a mildew or Oïdium stage of growth.

OLAX.

Stove evergreen climbers (*ord.* Olacineæ). Propagation, by cuttings of ripe growths in sandy peat,

Ogechee (*see Nyssa*).
Ohigginsia (*see Hoffmannia*).

Oil Nut (*see Pyrularia oleifera*).
Oil Palm (*see Elæis*).

beneath a bell-glass, over bottom heat. Soil, fibrous loam and sandy peat.

Principal Species :—

imbricata, 8′, win., wh.
scandens, 8′, win., wh.
stricta, 6′, aut., wh. (*syn.* Spermaxyrum strictum).

OLDENBERGIA.

A small genus of shrubs (*ord.* Compositæ). Propagation, by seeds. Soil, sandy peat.

Principal Species :—

Arbuscula, 4′ to 10′, sum., wh.

OLDENLANDIA.

Stove and greenhouse annuals and shrubs (*ord.* Rubiaceæ), of slender habit and no horticultural merit. Propagation, by seeds for the annuals and cuttings for the shrubs. Soil, loam and peat, both fibrous, with sand.

Principal Species :—

capensis, 6″, Jy., ann., wh.
corymbosa, 6″, Je., ann., wh.
deppiana, 1′, Je., st. ev., wh.

OLDFIELDIA.

Stove evergreen trees (*ord.* Euphorbiaceæ). Propagation, by cuttings beneath a bell-glass, over bottom heat. Soil, sandy loam. The principal species is africana, and this is probably not now in cultivation. It is a large tree with unattractive flowers, but its timber is stronger than Oak or Teak, though too heavy for general use.

OLEA. (OLIVE.)

A very important genus (*ord.* Oleaceæ), yielding the olive oil of commerce. The species are half-hardy shrubs, and produce fragrant flowers. Propagation, by cuttings in sand, under a hand-light; seeds in a frame; or grafting upon the common Privet. Soil, peat and loam, both fibrous, with coarse sand.

Principal Species :—

capensis, 6′, Jy., wh.
europæa, 6′, Jy., wh. (*syn.* Oleaster); sativa is a good var. Wild Olive.
fragrans (*see* Osmanthus fragrans).
laurifolia, 6′, sum., wh. (*syn.* undulata).
verrucosa, 6′, spr., wh.

OLEANDER (*see* NERIUM).

OLEANDRA.

Stove Ferns (*ord.* Filices), bearing yellow spores. Propagation, by spores and division. Soil, fibrous peat, loam and coarse sand. The long, creeping rhizomes are best pegged over a mound of soil, as by this means a fine specimen, covered with entire, lanceolate fronds, is produced.

Principal Species :—

articulata, fronds 6″ to 12″ long, ev.
neriiformis, fronds 6″ to 18″ long.
nodosa, fronds 6″ to 12″ long.
Wallichii, fronds 6″ to 12″ long.

Old Maid (*see Vinca rosea*).
Old Man (*see Artemisia, Abrotanum, and Rosmarinus officinalis*)
Old Man Cactus (*see Pilocereus senilis*).
Old Man's Beard (*see Clematis Vitalba*).
Oleaster (*see Olea europæa*).
Olcobachia (*see Sterculia*).

OLEARIA (*syn.* EURYBIA).

Description.—A rather large genus of greenhouse, half-hardy, or hardy shrubs and trees (*ord.* Compositæ), of which only a few have been introduced. They are generally very ornamental both in foliage and flower, and the hardy species ought to be more widely cultivated on walls or in the open.

Propagation.—By seeds, sown under glass in spring, by cuttings of half-ripened shoots struck under a bell-glass in heat, or by cuttings of old wood with a heel under glass, and by layers in autumn.

Soil.—Almost any soil, but the hardier species should have a warm, dry one.

Principal Species :—

argophylla, 4′, Jy., wh. Muskwood.
Haastii, 4′ to 6′, Aug., hdy., wh.; a good seaside shrub (*see p.* 130).
ilicifolia, 6′, sum., hdy., wh.; Musk-scented.
macrodonta, 6′, sum., hlf-hdy., wh. (*syn.* dentata of Hooker *fil.*).
stellulata, 4′, sum., wh. (*syns.* gunniana and Eurybia gunniana).
— lyrata, wh. (*syn.* O. lyrata).

Other Species :—

Forsteri, sum., hdy. or hlf-hdy., wh.
furfuracea, 10′, sum., grh., wh.
insignis, 3′, grh., wh.
myrsinoides, My., pale pur. (*syns.* Aster myrsinoides and Eurybia myrsinoides).
nitida, hdy., wh.
nummulariæfolia, 1′ to 8′, hdy., wh.
ramulosa, 6′, aut., grh., wh. (*syn.* Eurybia aculeata).
Traversii, 30′, grh., hdy. in sheltered places, wh. (*syn.* Eurybia Traversii).

OLIBANUM.

Frankincense is the English translation of the Hebrew *Lebonah*, the Greek *Libanos*, and the Roman *Thus*, and all are supposed to refer to the gum resin obtained from various species of Boswellia that grow in Arabia and Somaliland. The modern commercial equivalent of the title (Frankincense), so common in Bible history, is Olibanum. Olibanum is a yellowish, semi-transparent, bitter, and brittle resin that has some medicinal value, but is most largely used as incense in Roman Catholic, Buddhist, and other religious services. When burned, Olibanum gives off a strong aroma that is said to prevent mosquito and other insect attacks. The gum is obtained by making incisions in the stems of the tree and allowing the exudation to harden in tear-like masses. Boswellia Carteri and B. frereana are the chief sources of Olibanum.

OLYRA.

A genus of tropical Grasses (*ord.* Gramineæ), only two of which have yet been introduced. Propagation, by seeds and division. Soil, rich, well-drained loam.

Principal Species :—

concinna, stems 6″ to 10″, Jan., st. ev., an elegant pot plant.

OMPHALODES. (NAVELWORT.)

Pretty annual or perennial herbs (*ord.* Boragineæ), adapted for the border or rockery. They are prop-

Olfersia (*see Acrostichum*).
Olibanum Tree (*see Boswellia*).
Oliette (*see Papaver somniferum*).
Olive (*see Olea and Elæagnus*).
Olive Bark Tree (*Terminalia Catappa*).
Olive Wood (*see Elæodendron*).

agated by seeds sown in spring in the open or under glass; the perennials also by division at the same season. Any ordinary garden soil in a partially shaded position is suitable. The beautiful Alpine, Luciliæ, is liable to the attacks of slugs.

Principal Species :—

Krameri, 9″, sum., bl.
linifolia, 9″, Je., ann., wh. Venus's Navelwort.
Luciliæ, 4″, sum., per., bl.
nitida, 2′, My., per., wh.
scorpioides, 1′, Jy., ann., bl.
verna, 6″, Mch., per., bl.
— alba, wh.

and macranthum groups, which have the largest flowers, the sepals and petals are well developed. Oncidiums are closely allied to Odontoglossum, Miltonia, and Brassia. They are natives of Central America, ranging at varying altitudes from Mexico to Southern Brazil.

Compost, Potting, Propagation, etc.—Most Oncidiums require similar treatment to that accorded to the majority of Odontoglossums (which *see*).

Special Cultural Points.—A great mistake is made in keeping the roots of such species as

Photo: Chas. R. Bick.

Olearia Haastii (*see p.* 129).

ONCIDIUM.

Description.—Although not quite so important horticulturally as Odontoglossum, Oncidium (*ord.* Orchidaceæ) is a far larger genus, containing about 300 species. A score or so are first-rate garden plants, and in addition there are very many others which cannot be excluded as unworthy of cultivation. Over 100 species are grown at Kew; the Royal Horticultural Society has made awards to upwards of eighty species and varieties, and a trade catalogue of 1901 contains descriptions of about 150 species; these figures indicate the importance of the genus. The majority resemble the bulk of Odontoglossums in their leaves and pseudo-bulbs, but differ in inflorescence. One group (jonesianum, etc.) has cylindrical leaves; the macranthum group has long, flexuose spikes; krameriánum, lanceanum, and a few others have very broad, thick leaves; and a few, such as bicallosum and cavendishianum, have no pseudo-bulbs. As a general rule the labellum, or lip, is the most important part of the flower, but in the krameriánum crispum, excavatum, Forbesii, sphacelatum, varicosum, etc., too wet after the plants have completed growth, the result being an absence of flowers. These and other leathery-leaved species need only sufficient water at the period indicated to keep the leaves and pseudo-bulbs plump. Papilio, krameriánum, lanceanum, jonesianum, and Cebolleta are best grown in an East Indian House, and given little water when at rest. Ampliatum, sarcodes, cavendishianum, varicosum, and their varieties may be grown throughout the year in the intermediate house, as they appreciate more warmth than the macranthum group. Cebolleta, jonesianum, and other round-leaved species succeed best if fixed to small blocks of Teak wood, with a little peat and sphagnum placed about their roots. Most of them, jonesianum especially, require to be suspended upside down, like Cattleya citrina. The pretty little Limminghei has an ascending habit, and should be fixed to a piece of Tree Fern stem.

Temperatures.—Oncidiums can be arranged in three sections; those needing (1) stove, (2) intermediate house, and (3) cool house temperatures. The first section will succeed with the Aërides, Vandas, etc.; the second with Cattleyas and

Omalanthus (*see Homalanthus*).
Omphalobium (*see Connarus*).

Lælias; and the third with the Odontoglossums, if there are no special houses for them. In the following lists the sections are distinguished by (1) for stove, (2) for intermediate house, and (3) for cool house.

Natural Hybrids.—Several Oncidiums are regarded by horticulturists and botanists as natural hybrids, but as these have not been determined by artificial means their supposed parentage is given here instead of in the descriptive lists. Cabologlossum (marshallianum × Forbesii); elegantissimum (Forbesii × dasystyle); enderianum (crispum × curtum); flabelliferum (Forbesii × dasystyle); Gardneri (Forbesii × dasystyle); hæmatochilum (lanceanum × luridum); larkinianum (marshallianum × Forbesii); Mantinii (marshallianum × Forbesii or Gardneri); pectorale (Forbesii × marshallianum); pollettianum (dasystyle × Forbesii), and wheatleyanum (crispum × dasystyle). It will be noticed that several of these must bear a strong family likeness.

Principal Species and Varieties:—

[NOTE.—s. = sepals, p. = petals, l. = lip.]

altissimum, 18″, spikes 3′ to 5′, sum., s. and p. yel., marked reddish br., l. yel., reddish br. at base; (2).

ampliatum, 16″, spikes 2′ to 4′, spr., s. yel., reddish br., p. yel., l. yel., wh. beneath.

— majus, stronger grower, brighter colour; (1) or (2).

concolor, 6″, spike drooping, My., yel.; (3).

crispum, 1′, spike 3′ to 4′, sum., win., reddish br., yel.; (3).

—grandiflorum, more yel.; (3).

Forbesii, 1′, spike 2′ to 3′, aut., rounded, reddish br., margined yel.; (3).

— measuresianum, yel., br. margin; (3).

— moortebeekiense, a good form; (3).

Gardneri, 1′, spike 2′ to 3′, s. and p. reddish br., yel., l. yel., margined yel., br.; (3).

incurvum, 1½′, spike 3′ to 6′, aut., s. and p. vio., wh., l. wh., yel., fragrant (*syn.* albo-violaceum); 3.

— album, wh.; (3).

jonesianum, 1′, spike drooping 1′ to 1½′, s. and p. wh., spotted br., l. wh., spotted red at base; (1).

kramerianum, 10″, spr. to win., large, s. and p. reddish br., or. yel., l. broad, yel., with band of br. spots; (1).

lanceanum, 1½′, spike 1½′ to 2½′, sum., s. and p. greenish yel., spotted br., l. deep ro. pur.; (1).

macranthum, 1½′, spike 5′ to 10′, spr., large, s. yel., shaded br. or or., p. yel., l. wh., pur.; hastiferum and splendens are fine vars.; (3).

marshallianum, 1½′, spike 3′ to 6′, sum., s. and p. yel., br., l. yel., or. at base; superbum is a fine var.; (3).

ornithorhynchum, 10″, spike 1½′ to 2′, win., ro. lil., yel. crest.; albiflorum is whitish; album, rare, pure wh.; (3).

Papilio, 10″, spr. to win., large, s. and p. red, crim., yel., l. yel., red margin; (1).

Phalænopsis, 6″, spikes 1′ to 2′, spr., s. and p. wh., marked reddish pur., l. wh., vio. at base; (3).

sarcodes, 1½′, spikes 2½′ to 6′, spr., s. and p. br., yel., l. yel., br. at base; (2).

sphacelatum, 2′, spike 2′ to 5′, spr., small, s. and p. br., yel., l. yel., reddish br. band, easily grown; (2).

splendidum, 1½′, spike 2′ to 3′, win., s. and p. yellowish grn., marked br., l. yel.; (2).

superbiens, 1½′, spike 3′, spr., s. reddish br., yel., p. yel., marked br. at base, l. pur.; (3).

tigrinum, 1′, spike 2′ to 4′, s. and p. yel., barred reddish br., l. yel. (*syn.* Barkeri); var. unguiculatum is distinct; (3).

varicosum, 1′, spike 3′ to 5′, aut., win., s. and p. small, yel., barred br., l. yel., reddish br. at base; Rogersii is popular; Lindeni and moortebeekiense are good, the latter has a crim. base to the lip; (2) or (3).

Other Species and Varieties:—

acrobotryum (*see* harrisonianum).

albo-violaceum (*see* incurvum).

alcicorne, 10″, spike 2½′, sum., yel.; (3).

anceps (now Miltonia anceps).

aureum, 6″, spike 1½′, spr., s. and p. greenish yel., pur., l. yel.; (3).

auriferum, 10″, spike 1½′, spr., s. and p. yellowish br., l. yellowish red (3).

aurosum (now excavatum var.).

barbatum, 6″, spike 1½′, aut., s. and p. yellowish br., l. yellowish red (*syn.* ciliatum); (2).

Barkeri (*see* tigrinum).

batemannianum, 10″, spike 3½′, sum., s. and p. yellowish br., l. yel., pur. base; (3).

bicallosum, 10″, spike 1½′, win., s. and p. yellowish grn., br., l. yel., base red; (1) or (2).

bicolor, 9″, spike 1½′, aut., s. and p. yellowish br., l. yel., wh., base spotted br.; (2).

bicornutum (*see* pubes).

bifolium, 6″, spike 1½′, sum., s. and p. yel., reddish br., l. yel.; (2).

bifrons (*see* Warscewiczii).

bracteatum, 1′, spike 3½′, sum., s. and p. yel., spotted pur., l. yel.; (3).

brunleesianum, 10″, spike 1½′, sum., s. and p. yel., the latter marked red, l. yel., crim. centre; (1) or (2).

cæsium (*see* geertianum).

candidum, 9″, spike 1′, sum., s. and p. wh., l. wh., base yel., reddish br. (*syn.* Palumbina candida); (3).

carthaginense, 1′, spike 3½′, sum., wh., spotted ro. pur. (*syns.* Henchmanniiand huntianum).

— roseum, a pretty var.; (1).

cavendishianum, 1′, spike 2½′, sum., yel., fragrant; (2).

Cebolleta, 1½′, spike 2′, sum., s. and p. yel., spotted br., l. light yel. (*syns.* Cepula, juncifolium, and longifolium); (1) or (2).

Cepula (*see* Cebolleta).

cheirophorum, 6″, spike 8″, aut., yel., crest wh., fragrant; (3).

chrysoraphis, 6″, spike 1½′, spr., s. and p. yel., marked br., l. yel.; (2).

ciliatum (*see* barbatum).

citrinum, 6″, spike 1½′, sum., s. and p. yel., red, l. yel.; (2).

cornigerum, 9″, spike 1′, drooping, s. and p. yel., spotted reddish br., l. yel.; (2).

Crœsus, 5″ sum., s. and p. red br., l. yel. and red, base blk.

cryptocopis, 1½′, spike 4½′, spr., s. and p. red, br., or., l. yel.; (3).

cucullatum (*see* olivaceum).

cuneatum (*see* luridum).

curtum, 10″, spike 2½′, spr., s. and p. br., yel., l. yellowish br.; (3).

dasystyle, 6″, spike 1½′, win., s. and p. yel., reddish br., l. yel., crim. base; (3).

dicromum, 8″, spike 1½′, spr., s. and p. dull red, yel., l. or. yel.; (3).

divaricatum, 1½′, spikes 4½′, sum., s. and p. br., tipped yel., l. yel., reddish br.; (2).

elegantissimum, 10″, spike 2′, sum., s. and p. yellowish br., l. yellowish br., base pur.; (3).

enderianum, 10″, spike 2½′, sum., s. yel., br., p. br., yel., l. yel., reddish br.; (3).

euxanthinum, 10″, spike 1½′, drooping, aut., s. and p. yellowish br., l. yel., dotted red; (3).

excavatum, 1½′, spike 2½′, aut., s. and p. yel., red at base, l. yel.; var. aurosum, deeper colour; (3).

falcipetalum, 1½′, spike 10′ to 20′, aut., s. br., yel., p. yel., spotted br. at base, l. pur. br.; (3).

flabelliferum, 10″, spikes 2½′, sum., s. and p. br., yel., l. yel., spotted reddish br.; (3).

forstermannianum, 1′, spike 3′, yel., blotched reddish br.; (3).

fuscatum (*see* Miltonia Warscewiczii).

geertianum, 9″, spike 1½′, s. and p. yellowish grn., red., l. yel. (*syn.* cæsium); (3).

graminifolium, 1′, spike 4′, sum., aut., s. and p. yel., br., l. yel. (3).

grandiflorum, 1½′, spike 6′ to 12′, sum., s. and p. br., yel., l. br.; (3).

gravesianum, 8″, spike 2½′, sum., s. and p. br., yel., l. yel., border and base br.; (3).

guttatum (*see* luridum var.).

hæmatochilum, 10″, spike 2′, aut., s. and p. yellowish grn., spotted br., l. red, border yel., red; (1).

harrisonianum, 6″, spike

1′, aut., s. and p. yel., marked red, l. yel., base red (*syn.* acrobotryum); (2).
hastatum, 10′, spike 4′, sum., s. and p. yellowish grn., br., l. yel., red, wh. (*syn.* stelligerum); Roezlii has l. red, lobes yel.; (2).
hastiferum (*see* macranthum var.).
Henchmannii (*see* carthaginense).
heteranthum, 6″, spike 3½′, sum., s. and p. wh., br., l. yel., base reddish br.; (2).
hians, 3″, spike 8″, sum., s. and p. reddish br., yel., l. yel., spotted reddish br.; (2).
Hookeri, 8″, spikes 1½′, s. and p. yel., spotted red, l. yel., base reddish br.; (3).
huntianum (*see* carthaginense).
hyphæmaticum, 1¼′, spike 4½′, aut., s. and p. br., yel., l. yel., red beneath; (3).
insculptum, 1½′, spike 10′, sum., br., yel.; (3).
intermedium (*see* luridum var.).
iridifolium, 3″, sum., yel., spotted red; (2).
janeirense (*see* longipes).
juncifolium (*see* Cebolleta).
lamelligerum, 2′, spike 6′ to 10′, sum., s. br., edged yel., p. yel., base br., l. yellowish pur.; (3).
larkinianum, 10″, spr., s. and p. yel., br., l. yel., base br.; (3).
leucochilum, 1¼′, spike 6′, sum., s. and p. yellowish grn., br., l. wh.; (3).
Limminghei, 3″, sum., s. and p. yellowish br., l. yel., red; (1).
longifolium (*see* Cebolleta).
longipes, 5″, sum., s. and p. reddish br., l. yel., base wh., red (*syn.* janeirense).
loxense, 1½′, spike 5′, spr., s. br., yel., p. br. with fewer yel. marks; l. or. yel.; (3).
lucasianum, 8″, spike 3′, spr., yel., br. base to l.; (3).
luridum, 1¼′, spike 6′, yellowish grn., spotted reddish br. (*syn.* cuneatum); guttatum has or. spots; intermedium is large; (1).
maculatum, 1′, spike 1½′, win., s. and p. yellowish grn., blotched reddish br., l. wh., yel.
Mantinii, 1′, spike 2½′, win., s. and p. yel., reddish br. centres, l. yel., br.; (3).
martianum, 8″, spike 1¼′, sum.; (3).
monachicum, 1½′, spike 6′ to 12′, spr., s. br., upper one edged yel., p. reddish br., yel., l. br.; (3).
monoceras (*see* unicorne).
nanum, 4″, sum., yel., spotted red; (1).
nigratum, 1½′, spike 10′ to 15′, spr., s. and p. wh., marked pur., l. yel., reddish br.; (1).
nubigenum (*see* olivaceum var).
obryzatum, 1′, spike 5′, win., s. and p. yel., base red, l. yel., base or.; (3).
olivaceum, 6″, spike 1½′, spr., s. and p. grn., br., l. ro. pur., marked crim. pur. (*syn.* cucullatum); andigenum, flavidum, lawrenceanum, maculosum, and nubigenum are distinct vars.; (3).
phymatochilum, 1¼′, spike 4′, sum., s. and p. yel. or wh., marked br., l. wh., spotted red; (2).
pollettianum, 1′, spike 2′, spr., yel., reddish br.; (3).
prætextum, 10″, spike 2½′, spr., s. reddish br., marked yel., p. reddish br., l. yel., br. margin; (3).
pubes, 6″, spike 1½′, sum., s. and p. reddish br., spotted yel., l. reddish br., edged yel. (*syn.* bicornutum); (2).
pulchellum, 5″, spike 1¼′, sum., wh., ro., yel. spot on l.; (1).
pulvinatum, 1′, spike 6′, sum., s. and p. yel., base reddish brown, l. yel., spotted red; (1).
pumilum, 3″, spike 6″, sum., s. and p. yel., spotted br., l. yel.; (2).
reflexum, 10″, spike 2½′, aut., s. and p. yellowish grn., marked reddish br., l. yel., base spotted red; (3).
Rogersii (*see* varicosum var.).
roseum (*see* carthaginense var.).
rupestre, 1′, spike 1½′, s. and p. yel., base br., l. yel., base reddish br.; (3).
russellianum (*see* Miltonia russelliana).
saintlegerianum (*see* spilopterum).
sanderianum, 1½′, spike 6′ to 12′, sum., s. br., edged yel., p. and l. yel., base reddish br.; (3).
schillerianum, 8″, spike 3′, sum., yellowish br.; (2).
Schlimii, 10″, spike 4′, s. and p. yel., blotched reddish br., l. yel., barred reddish br.; (2).
serratum, 1½′, spike 6′ to 12′, sum., s. and p. reddish br., edged yel., l. pur. br., base wh.; (3).
spilopterum, 3″, spike 1½′ to 3′, spr., s. and p. yel., marked br., l. yel., pur. (*syn.* saintlegerianum); (3).
Sprucei, 2′, spike 2½′, sum., yel., red; (2).
stelligerum (*see* hastatum).
tetracopis, 1½′, spike 6′, sum., yellowish br.; (3).
triquetrum, 5″, spike 1′, aut., s. pur. grn., p. and l. wh., spotted pur.; (1).
trulliferum, 1½′, spike 2′, aut., s. and p. yel., reddish br., l. yel. reddish br. at base; (2).
undulatum, 1½′, spike 4′, sum., s. br., grn., p. wh., marked pur., l. pur.; (3).
unguiculatum (*see* tigrinum var.).
unicorne, 10″, spike 1¼′, win., s. reddish br., p. reddish br., tipped yel., l. yel., base red (*syn.* monoceras); (2).
urophyllum, 5″, spike 2′, sum., s. and p. yel., br., l. yel., base wh., red.; (1).
volvox, 1′, spike 4′, aut., s. and p. yel., spotted br., l. yel., red; (2).
Warneri, 6″, spike 1′, s. and p. greenish wh., marked ro. pur., l. yel.; (3).
Warscewiczii, 1′, spike 1½′, sum., yel., l. br. base (*syn.* bifrons); (3).
Weltoni (*see* Miltonia Warscewiczii, var. Weltoni).
wentworthianum, 1¼′, spike 5′, s. and p. yel., br., yel. tips, l. yel., base reddish br.; (2).
wheatleyanum, aut., s. and p. brownish crim., edged yel., l. yel., edged crim.; (3).
zebrinum, 16″, spike 5′, aut., s. and p. wh., reddish pur., l. wh., spotted reddish br.; (3).

ONCOCYCLUS.

The plants formerly called Oncocyclus are now included with the Irises (which *see*), but the name has been retained as that of a sub-genus. In gardens, however, both the Oncocyclus and Regelia Irises, which require the same cultural treatment, are commonly spoken of as "Oncocyclus or Cushion Irises." They require special treatment in most gardens, although hardy. After flowering they must be kept dry to ripen the rhizomes and to retard growth as late as possible. This may be done by covering them with a frame to keep off rain. Damp should also be prevented from rising by growing them on a raised bed with flat stones or cement beneath. In dry gardens a few, such as Iris susiana, do well under a south wall in a dry border. Some growers lift the roots after flowering, and keep them dry until October. The Oncocyclus Irises like lime in the soil, and are so beautiful and singular in their colour that they are worth the trouble they require. (*See* IRIS.)

ONCOSPERMA.

Stove Palms (*ord.* Palmæ), of slender habit. Propagation, by imported seeds and suckers. Soil, sound loam.

Principal Species :—

fasiculatum.
filamentosum.
van houtteanum (now Nephrosperma van houtteanum).

ONION.

Description.—The Onion (Allium Cepa, *ord.* Liliaceæ) is one of the most popular and most

Oncœma (*see Oxera*).
Oncorhynchus (*see Orthocarpus*).

valuable vegetables. By successional sowings of suitable varieties, Onions may be had in use the whole year round.

Raising in Boxes.—The system of raising Onions for the summer crop in shallow boxes, though by no means modern, has not, until recent years, obtained a particular vogue. Its advantages are that it gives the plants a longer season in which to build up their bulbs, thus ensuring a heavier crop, and the comparative immunity that such stock will enjoy from attack by the Onion maggot or grub. January and February are the best periods for sowing, and a greenhouse temperature is suitable. The seeds should be sown on the surface of light soil in shallow boxes, and be only just covered with fine soil and then brown paper. Subsequently the seedlings must be thinned, if necessary, and afterwards be transferred to other boxes or a frame. The chief danger lies in the soil becoming dry, which will be inimical to good results. The plants are placed in their permanent quarters when soil and weather are favourable, from the middle to the end of April.

The Summer Crop.—The main crop is sown in March and April, in drills 10″ asunder, the plants being eventually thinned so that they stand clear of each other. In some cases the bulbs will be in a piled-up cluster, in which condition they may be left, as they develop into small but excellent keeping stock. The ground should have been thoroughly prepared in autumn by deep digging and the incorporation of the best natural manure that is available. Prior to sowing it must be made firm. The summer work will consist mainly in keeping the ground free from weeds by light surface hoeings and top-dressings, with short manure to prevent loss of moisture by evaporation. When the bulbs have attained full size the tops should be carefully broken over to assist and hasten maturation.

The "Autumn Sown" Crop.—This is commonly called the winter crop. The treatment is the same as for the main bed, but the seeds are sown in July or August, according to the condition of the soil and the climate. Thinning is usually deferred till the spring, when the pullings are used as "Spring Onions"; plants may be moved to any other prepared quarters if desired, and it is frequently found that these thrive better than those not transplanted.

Harvesting Onions.—It is important that the bulbs be perfectly ripened before storage. To ensure this let them remain thinly on the ground, on the sides of paths, under an open shed, or on the stages of a vinery. This allows sun and air to play their part in perfecting development, and has a marked effect on the keeping properties of the crop.

Storing Onions.—Properly ripened Onions stored in "ropes" in a dry place will keep for an uncertain period; they are not affected by frost provided this be not accompanied by dampness. Any bulb showing traces of decay should be removed.

Photo : Cassell & Company, Ltd.

ONION LORD KEEPER; BEDFORDSHIRE CHAMPION ON THE RIGHT (*see p.* 134).

Onions for Exhibition. — The production of immense bulbs for exhibition necessitates a somewhat elaborate system of culture. The soil is prepared by taking out a trench to a depth of 2′, in the bottom of which is placed a layer of good manure. As the soil is worked on to this, heavy dressings of short manure are added. The whole is firmed, and plants from seeds sown in boxes in January are planted in drills 15″ apart, and not less than 12″ asunder in the rows. Mulchings of short manure are necessary, with heavy watering in dry weather. Light dressings of superphosphate of lime, soot, and nitrate of soda, given alternately, add considerably to the size of the bulbs.

Onions for Pickling.—Silver Skinned and The Queen are useful varieties for this purpose. The seeds should be sown broadcast or thickly in rows on firm, poor ground early in April, and small, very hard bulbs will be produced in abundance.

Selections of Varieties:—

Main Crop:—

White Lisbon.	For early use.
White Spanish.	
Bedfordshire Champion.	For keeping.
James's Keeping.	
Sutton's A1.	
Improved Wroxton.	
Ailsa Craig (*see* figure).	For exhibition.
Lord Keeper (*see p.* 133).	
Cocoa Nut.	
Cranston's Excelsior.	
Inwood Favourite.	
Ne Plus Ultra.	
Lemon Rocca.	For autumn sowing.
Giant Rocca.	
Flat Tripoli.	
Red Tripoli.	

of a fungus or mould, which discolours the foliage, and prevents the bulbs swelling. Dusting with lime is the best remedy, but it must be done at the first sign of the pest to be effectual.

ONISCUS.

A genus of Onisciдeæ, a family of Crustacea, hence allied closely to the shrimps, crabs, and spiders. Under the popular name of woodlice, or slaters, the pests are familiar to gardeners. (*See also* WOODLICE.) The Onisciдeæ bear a resemblance to true insects in their general structure, but they breathe by gills instead of by air tubes (tracheæ), and have more than three pairs of jointed legs. They live in dark places, and are frequently a great nuisance in plant and fruit houses and in frames. The Orchid grower is well

Photo: Cassell & Company, Ltd.

ONION AILSA CRAIG; DANVERS' YELLOW ON THE RIGHT.

For Potato or underground Onions *see* POTATO ONIONS, for Tree Onions *see* TREE ONIONS.

Onion Fly.—This pest (Anthomyia Ceparum) is troublesome when the plants are young. Damage is minimised by early sowing, so as to get the skin of the leaves tough before the fly appears; also by dusting with soot when the plants are damp with dew, and by spraying with a solution of a wineglass of petroleum, 2 oz. Quassia chips, 2 oz. of soft soap, and a gallon of water. The mixture must be kept thoroughly agitated or the oil will not mix with the water.

Onion Sickness.—Little is known of this disease, which culminates in the crop suddenly turning yellow before ripening is complete. The bulb becomes detached from the roots, and every portion of the plant turns rotten.

Onion Mould.—The growth of Onions is sometimes abruptly checked in summer by the attack of a fungus or mould, which discolours the foliage, and prevents the bulbs swelling. Dusting with lime is the best remedy, but it must be done at the first sign of the pest to be effectual.

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ONOBRYCHIS.

A large genus (*ord.* Leguminosæ) of herbs or sub-shrubs. Very few of them are of any garden value, although the Sainfoin, sativa (*syn.* viciæfolia), is a well-known fodder plant. A field of it in bloom is an exceedingly fine sight. Propagation, by seeds sown in spring. Any ordinary

Onobroma (of Gærtner, see Carduncellus).

garden soil will suit, although the best Sainfoin comes from rich, loamy soils.

Principal Species :—

Caput-galli, 1½′, Jy., hdy., flesh pk. (*syn.* Hedysarum Caput-galli).
laconica, 1′, sum., hdy., bright pk.
radiata, 1½′, Je., hdy., yellowish wh., red.
sativa, 2′ to 3′, sum., hdy., red, wh. (*syn.* viciæfolia). Common Sainfoin.
— montana, a pretty, low growing var., suitable for the rockery; ro. pur.

ONOCLEA.

Effective and pretty hardy Ferns (*ord.* Filices), which thrive in good soil, especially where moist, as by the margin of a stream or pond. They are easily propagated by means of their stolons, which ramble about freely in suitable positions, and may be removed in spring or autumn. One part of leaf soil and three of fertile loam will suit them well.

Principal Species and Varieties :—

germanica, 2′ to 3′. A very ornamental species (*syns.* Struthiopteris germanica and pennsylvanica). Ostrich Fern.
— recurva, edges of fronds recurved.
orientalis, 2′. A fine species (*syn.* Struthiopteris orientalis).
sensibilis, 1½′ to 3′. An effective plant.
— obtusilobata, a rare and pretty form.

ONONIS.

A large genus (*ord.* Leguminosæ) of hardy annual, biennial, or perennial herbs, or shrubs. Several species make charming rock plants, and amongst them may be noted the pretty British Rest Harrow. Propagation is by seeds, which are best sown in spring; also by division of the root in autumn or spring for the perennial herbs. Almost any fairly fertile soil will do, but arvensis likes a high and well-drained situation.

Principal Species and Varieties :—

aragonensis, 1½′, My., Je., hdy. shr., yel.
arvensis, 6″, sum., hdy., ro., wh.; procumbent (*syn.* spinosa). Rest Harrow.
Natrix, 1½′ to 2′, sum., hdy. per., yel., veined red. Goat Root.
— hispanica, 1½′, Jy., hlf-hdy., yel. (*syn.* hispanica of *Botanical Magazine* 2450).
rotundifolia, 1′ to 1½′, sum., hdy. shr., ro.
— splendens, larger and more richly coloured flowers.

Other Species :—

fruticosa, 1′ to 2′, sum., hdy. shr., pur. (*see p.* 136).
minutissima, 3″, Je., hdy. bien., yel.
pedunculatis, 1″, Ap., hlf-hdy. herbaceous per., wh.
viscosa, 1½′ to 3′, sum., hdy. ann., yel., striped pur.

ONOPORDON. (Cotton Thistle.)

Annual, biennial, or perennial herbs (*ord.* Compositæ), with winged stems, and, in some cases, showy heads of flowers. Seeds may be sown in well-drained soil in spring. Several of the species do well in the wild garden, but they are rather too weedy-looking for the herbaceous border. Ordinary garden soil.

Principal Species :—

Acanthium, 4′ to 5′, Jy., hdy. per., pur. The best of all. Common Cotton Thistle.
illyricum, 6′, Jy., hdy. bien., pur., lvs. more deeply cut and spiny than those of Acanthium (*syns.* elongatum and horridum).

Other Species :—

arabicum, 8′, sum., hdy. bien., pur.
bracteatum, 6′ to 9′, sum., hdy. bien. or per., pur.
elongatum (*see* illyricum).
horridum (*see* illyricum).
macrocanthum, 6′, Jy., hdy. ann., pur.

ONOSERIS.

Perennial herbs and shrubs (*ord.* Compositæ). Very few of the species have been introduced to this country, and even those which have are not well known. Propagation is by seeds, and the soil must be light and rich.

Principal Species :—

adpressa, 1′ to 2′, Je., Dec., st. shr., ro. pur., yel., fragrant; branches wh., woolly.
drakeana, grh. shrubby per., bright pur.
purpurata, grh. per., pur.
reflexa, 1½′ to 2′, late aut., st. ann., ro. pur., yel., fragrant (*syn.* Centroclinium reflexum of *Botanical Magazine* 3114).

ONOSMA. (Golden Drop.)

The Onosmas are among the prettiest of perennial rockery plants (*ord.* Borragineæ), and are easily grown in a light, sandy soil, in a sunny position. In wet districts they ought to be protected from winter rains by a sheet of glass or a slate overhead, giving them, however, all the air possible. They are propagated by seeds or cuttings. Alboroseum should be propagated by cuttings annually, as it is a short-lived plant. All make good plants for the Alpine house.

Principal Species :—

albo-roseum, 6″, sum., wh., ro.
Bourgæi, 6″, sum., yel.
echioides, 1′, My., yel.
pyramidalis, 1′, Sep., grh. or hlf-hdy., sc.
simplicissimum, 1′, Ap., yel.
stellulatum, 6″, My., hdy., yel., citron, wh.
— tauricum, yel.
Thomsoni, 6″, sum., yel.

ONOSMODIUM.

About six species of hardy herbaceous perennials (*ord.* Borragineæ), of upright habit. They are closely related to the Onosmas, and should be treated like them. Very few of the species have been introduced, and even these are rather rare in cultivation.

Principal Species :—

carolinianum, 1′, sum., hdy., yellowish wh., drooping. Carolinianum of De Candolle is referred to molle, and that of Torr. to bejariense, by *Index Kewensis*.
virginianum, 1′, sum., hdy., yel.; plant covered with bristly hairs.

ONYCHIUM.

Description.—A small genus of Ferns (*ord.* Filices). They are closely related to Pteris, but have much more finely cut fronds. Auratum and japonicum are the only species that are common in cultivation, and these are grown as much for their beauty as pot or pan plants as for the value of the fronds for cutting. The fronds make pretty screens and albums when dried.

Propagation.—By spores. Sporelings of auratum want careful management or they quickly damp off. Japonicum may be increased easily by division of the numerous crowns; auratum makes but a single crown.

Soil.—Fibrous loam, peat or leaf mould, and sand, in equal parts, with a few pieces of charcoal.

Onychium (*of Blume, see Dendrobium*).

Other Cultural Points.—Japonicum is semi-deciduous, and should be kept rather dry during winter. Auratum is evergreen. Snowy fly is the most troublesome insect pest; remedy, sponging with soapy water.

OOSPORA ABIETINUM.

This is the fungus which attacks several species of Abies so severely as to cause wholesale premature dropping of the leaves. Nordmanniana and Pinsapo are the greatest sufferers. The parts of the fungus are exceedingly small, and it is difficult to deal with it. The collection and burning of the fallen leaves are, however, helpful.

Photo: Cassell & Company, Ltd.

ONONIS FRUTICOSA (*see p.* 135).

Principal Species:—

auratum, fronds 12″ long, 8″ to 9″ broad, quadripinnatifid, st. ev.

japonicum, fronds 12″ long, 6″ broad, quadripinnatifid, semi-deciduous (*syns.* capense and lucidum). There is a var. multisectum.

Other Species:—

capense of gardens (*see* japonicum).

lucidum of gardens (*see* japonicum).

melanolepis, fronds 3″ to 4″ high, 2″ broad, quadripinnatifid, grh.

strictum, fronds 6″ to 9″ long, 3″ to 4″ broad, quadripinnatifid, st.

OOSPORE.

Literally an egg spore. Oospore is the technical name given by botanists and zoologists to the spore, formed by the fertilisation of the oosphere by the male element. Thus the oosphere may be described as the incipient egg before fertilisation, it being an oospore after fertilisation. The oospore, or resting spore, is of considerable interest

to gardeners, for in many fungoid pests, notably in Phytophthora and Peronospora (which *see*), this resting spore is developed to tide the fungus over the winter and begin the work of infection anew in the spring and summer. The oospore has a much thicker cell wall than the swarm or summer spore, and is thus able to withstand a considerable degree of cold, as well as the effects of damp or long continued drought.

OPERCULARIA.

Australian greenhouse herbs or sub-shrubs (*ord.* Rubiaceæ), occasionally twiners. Propagation is by seeds, sown in spring, on a gentle hotbed; also by cuttings of young shoots, at the same season, and by root division just as growth is starting. Soil, sandy loam, fibrous peat, and leaf soil, in equal parts, with a few pieces of charcoal and a little sand, The species are rarely seen in gardens.

Principal Species :—

aspera, 1′, Je., grh. sub-shr., wh., flower heads globular (*syn.* ocimifolia).
hispida, 1′, Jy., grh. sub-shr., flowers wh., heads small, lvs. roughly hairy.

OPHIOCAULON.

Three or four species of climbing shrubs or herbs (*ord.* Passifloreæ). All need a stove temperature. They may be propagated in the same way as Passifloras, and like sandy loam and leaf mould in equal parts for soil. The plants are liable to damp off during the autumn and winter unless they are kept rather dry.

Principal Species :—

cissampeloides, st., lvs. grn., mottled wh., dotted blk. (*syn.* Passiflora marmorata of gardens).

OPHIOGLOSSUM. (Adder's or Snake's Tongue Ferns.)

A small genus (*ord.* Filices) of curious Ferns, whose sporangia, borne on a long, narrow spike, have given rise to the popular name of Adder's Tongue Ferns. The barren fronds are usually entire. None of them have great decorative value, and yet their curious appearance has secured for them considerable attention. They do best when planted out in a damp spot either under glass or outdoors, according to the character of the species. Propagation is by division. Soil, loam and sphagnum moss in equal parts, with sand. Plenty of water is a necessity, but stagnant conditions must be avoided.

Principal Species and Varieties :—

palmatum, fronds 8″ to 20″ high, lobed, grh., epiphytal.
— ambiguum, a dwarfer form with a longer spike, hdy.
vulgatum, fronds 3″ to 9″ long, spike about 1″ long. British. Common Adder's Tongue.
— pedunculosum, st.
— polyphyllum, an Azorean var.

Other Species :—

bulbosum, fronds 2″ to 4″ long, spike ¼″ to ½″ long, hlf-hdy., rootstock tuberous (*syn.* tuberosum).
lusitanicum, fronds 1″ to 3″ long, spike ¼″ to ½″ long, hlf-hdy., rootstock a little tuberous.
pendulum, fronds 1′ to 1¼′ long, 1″ to 3″ broad, pendulous, st. Furcatum is probably a var.
reticulatum, fronds 6″ to 12″ long, spike 1″ high, st.
scandens (*see* Lygodium scandens).

Opera Girls (*see Mantisia*).
Ophelia (*see Swertia*).

OPHIOPOGON.

Interesting, but not showy, hardy or half-hardy perennial herbs (*ord.* Hæmodoraceæ), with racemes of small flowers, and narrow leaves. In cold districts they must be kept under glass in winter; and all make good pot plants, especially those with variegated foliage. They are propagated by division in spring, and like a sandy soil.

Principal Species and Varieties :—

intermedius, 1½′, sum., lil. (*syn.* spicatus of Don, japonicus intermedius, and Flüggea intermedia).
— wallichianus.
— argenteo-marginatus, wh., lvs. margined wh.
Jaburan, ½′ to 1½′, Jy., wh., tender.
— variegatus, bl., lvs. striped, grn., wh.
japonicus, 1½′, Je., wh. (*syn.* Flüggea japonica).
— variegatus, lvs. striped yellowish wh.
spicatus of Ker and Hooker is Liriope spicata.

OPHRYS.

Interesting and pretty hardy or half-hardy terrestrial Orchids (*ord.* Orchidaceæ), which are very suitable for growing in the rock garden or in a frame, in a sandy loam of a calcareous nature. They are propagated by division of the tubers. The best for growing outdoors are apifera, aranifera, and muscifera, all natives of Britain. The nomenclature of the Ophrys is very confused.

Principal Species :—

apifera, 1′, Ap., grn., ro. Bee Orchis.
— alba, wh.
Arachnites, 1′, Ap., grn., ro.
aranifera, 6″, grn., br. Spider Orchis.
Bertolonii, 1′, Ap., ro. maroon.
bombilifera, 9″, grn., br. Humble Bee Orchis.
lutea, 4″ to 8″, yel., br. (*syn.* vespifera of Brot., not Willdenow).
muscifera, 9″, My., pur. Fly Orchis.
Speculum, 1′, Ap., grn., bl., maroon.
tenthredinifera, 9″, Ap., various.

OPLISMENUS.

A small genus (*ord.* Gramineæ), and until recently an obscure one. Oplismenuses may be propagated by division, and by seeds, which are produced with considerable freedom. Soil, loam and leaf mould in equal parts, with one-sixth of the whole sand. Plenty of water is needed.

Principal Species and Varieties :—

Burmannii albidulus, st. or grh., smaller, dwarfer, and whiter than variegatus, which it resembles.
— variegatus, the correct name of Panicum variegatum of gardens.
compositus hirtellus, Jy., st. or grh., lvs. 1½″ to 2½″ long (*syns.* hirtellus and Orthopogon hirtellus).
— loliaceus, Jy., Aug., st. or grh., lvs. 2″ to 4″ long (*syns.* loliaceus and Orthopogon loliaceus).

OPOPANAX (*syn.* Opoponax).

A hardy perennial herb (*ord.* Umbelliferæ) of rather coarse and weedy habit, and of no great value. It may be consigned to the wild garden. Seeds sown in the open ground in spring germinate

Ophiopteris (*see Oleandra*).
Ophioscorodon (*see Allium*).
Ophiospermum (*see Aquilaria*).
Ophiostachys (*see Chamælirium*).
Ophioxylon (*see Rauwolfia*).
Opime Plant (*see Plectranthus*).
Opium Poppy (*see Papaver somniferum*).

freely, and the seedlings may be at once transferred to their permanent flowering quarters.

Only Species :—

Chironium, 6′, Je., Jy., hdy., yel. (*syns.* Malabaila Opopanax and Pastinaca Opopanax).

OPUNTIA. (Indian Fig. Prickly Pear.)

Description.—A large and important genus of succulent trees and shrubs (*ord.* Cacteæ). Many of the species have large and showy flowers, and Pear-like, edible fruits, and, despite the poisonous character of the spines and prickles, many species are cultivated. Quaint and curious plants are

Soil.—Crushed bricks one part, and loam two parts. If the drainage is free, loam alone will suffice for the larger plants.

Other Cultural Points.—The essentials are (1) plenty of light, (2) very free drainage, (3) little or no water during the winter. The hardy forms should be grown in a frame. The frames may be placed over them during the winter and removed in late spring. A miniature rockery constructed of lumps of hard-baked earth, brick burrs, and stone, with pockets of soil here and there, will suit Opuntias well. Under glass it is well to devote a special house, if only a small one, to them, as this can be

Photo: Cassell & Company, Ltd.

Opuntia leucotricha (*syn.* ursina) (Grizzly Bear Cactus).

not uncommon, but there is not so much variation amongst the Opuntias as there is amongst the members of some of the other genera of Cacti. Some are hardy as far as cold is concerned, although always impatient of wet during the winter months, and others need a stove temperature, but the greater number may be accommodated in a warm greenhouse, where rather dry and airy conditions can be maintained. The spines show a good deal of variation, and display their maximum of beauty in the group platyacantha, as typified by papyracantha, and a few other species. Here they are long, very broad, white, and paper-like in consistency.

Propagation.—By cuttings, which should be dried somewhat before they are inserted in the soil. By seeds; also by grafting—O. Ficus-indica is a favourite stock. (For other details, *see* Cactus.)

Oporanthus (*see Sternbergia*).

easily fitted up with shelves, when the plants will not only be brought up close to the light, but a larger number can be accommodated.

Principal Species and Varieties :—

[Note.—Except where otherwise stated a warm greenhouse is required.]

frts. = fruits. s. = spines. t. = tubercles.

arborescens, 5′ (naturally 20′ to 30′), sum., pur., t. grn., spiny, s. variable.

Bigelovii, 10′ to 12′, t. hemispherical.

brasiliensis, 10′ to 30′. Je., lemon yel., frts. nearly round, yel., spiny.

camanchica albispina, hdy., frts. red, s. wh.

cylindrica, 6′, sc., frts. yel., s. wh., slender.

— cristata, Cockscomb-like.

Davisii, dwarf, bronze grn.

decumana, sum., st., or., frts. br. red, 4″ long, sweet. The largest species in cultivation (*syn.* maxima).

echinocarpa, dwarf, sum., grn., yel., frts. very spiny.

— major, 4′.

Emoryi, Aug., Sep., yel., pur., t. very spiny.

Engelmanni, 4″ to 6″, hdy., My., Je., yel.

Ficus-indica, 2′, My., hdy, yel., frts. red, spiny. Indian Fig.
filipendula, 1′ to 2′, My., Je., st., pur., 2½″ across, s. wh., solitary.
leucotricha, Je., st., flowers variable, s. wh., lengthening with age and becoming hair-like (*syn.* ursina; *see p.* 138).
macrocentra, 3′, Je., yel., 3″ across, s. grey.
missouriensis, dwarf, My., Jy., hdy., yel., frts. dry, prickly (*syn.* polyacantha). Many vars., including albispina, erythrostema, salmonea, and trichophora).
monacantha variegata, 1′, a pretty variegated var.
polyacantha (*see* missouriensis).
Rafinesquii, 1′, Je., hdy., yel., red; referred by the *Kew Hand-List* to mesacantha.
— arkansana, 1′, Je., Jy., hdy., yel., 3½″ across.
rosea, Je., ro., 2″ across, s. yel.
salmiana, 2′, Sep., yel., red.
subulata, spr., dull pur., frts. Pear-shaped, s. wh.
Tuna, 20′, Jy., st., reddish or., frts. car., 2″ to 4″ long., s. yel., spreading.
— horrida, s. red, a very strong, ferocious looking plant.
vulgaris, 2′, Je., yel., (*syn.* Cactus Opuntia of *Botanical Magazine* 2393); referred by *Kew Hand-List* to mesacantha.
Whipplei, Je., st., red, 2″ across.
— rosea, hdy., ro. car.

Other Species and Varieties:—

andicola, joints Cucumber-like, s. wh.
Arbuscula, 7″ to 8″, Je., grh. or st., grn., yel., red, s. wh.
arenaria, My., st., s. wh., yel. tipped.
Auberi, s. wh.
aurantiaca, 3′, or. yel., s. wh., br.
basilaris, sum., ro. pur., frts. round, stems club-shaped.
boliviana, 1′, t. round, greyish yel. when young, s. wh.
brachyarthra, flowers very small.
camanchica, hdy., tufted, frts. oval, red., sweet, s. red br., or blk. br.
— major, has large joints.
— minor, has small, prickly joints.
— orbicularis, strong-growing, s. light br.
— rubra, flowers dark red, stamens yel.
— salmonea, flowers salmon.
clavata, st., yel.
coccinellifera (now Nopalea coccinellifera).
corrugata, 2′, Aug., red, yel.
crinifera, s. wh., long and silky.
curassavica, 6′, Je., yel. Several vars.
dejecta (now Nopalea dejecta).
diademata, joints globose, s. grey, very dwarf and slow-growing.
Dillenii, 5′, Sep., yel. (*syn.* Cactus Dillenii of *Botanical Register* 255).
floccosa, 4″ to 5″, stems club shaped.
formidabilis, s. stiff, wh., 6″ in length.
fulgida, 5″ to 12″, Jy., Aug., pk., s. stellate.
Grahamii, Je., st., yel., 2″ across, roots thick and fleshy.
horrida (*see* Tuna var.).
humilis (*see* Tuna).
hystricina, hdy. or hlf-hdy., yel., large.
invicta, yel., 2″ across, frts. covered with red spines.
monacantha, 1′, s. br., yel., very rigid, solitary.
nigricans, 3′, Aug., pk. (*syn.* Cactus Tuna nigricans of *Botanical Magazine* 1557).
pachyclada rosea, hdy., reputed hybrid (fragilis × xanthostema).
papyracantha, s. much flattened, broad, long, wh., and paper-like.
Parryi, yellowish grn.
Pes-corvi, 1′ to 2′, sum., yel.
phœacantha, 3′, Je., yel. (*syn.* Cactus polyanthus of *Botanical Magazine* 2691).
pulverulenta, plant greyish bl., t. large, round, bristly.
Segethi, pk., 1½″ across.
spinosissima, 20′, Je., st., red or., probably a var. of Tuna.
stenopetala, yel., small (*syn.* grandis).
sulphurea, 2′, Jy., yel.
tunicata, s. wh.

ORACH.

This, the Atriplex hortensis of the botanist, is occasionally grown as a substitute for Spinach. The Red Mountain Spinach (A. h. rubra) grows to a height of 3′ or 4′, has fine ornamental foliage, and a stately presence in the herbaceous border. (For further details of the genus, *see* ATRIPLEX.)

Seed of Orach may be sown in rather deep drills 2′ apart early in March, and if a succession is desired, other sowings must be made at intervals of from three weeks to a month, as the plants speedily run to seed. The seed, if it is to be saved, should be gathered before it is quite ripe, for as it approaches ripeness a moderate breeze will empty the vessels. Orach may be treated in much the same way as the Round-leaved or Summer Spinach.

ORANGE.

Description.—The Orange (Citrus Aurantium) has been cultivated for many years in the warmer portions of the Northern Temperate Zone for its delicious fruit, which yearly reaches our shores in ever-increasing numbers.

Here in Britain a few Oranges are grown, but chiefly for ornamental purposes; this, too, in spite of the fact that home-grown Oranges, when properly treated, are much superior in flavour to the imported fruits. On the Continent Oranges are largely cultivated for the sake of their flowers, which are employed in the manufacture of Orange Flower Water.

Oranges as Decorative Subjects:—

Although not hardy the Orange is of strong constitution and will stand a good deal of knocking about, as well as a rather low temperature. Many pot trees are carried safely through the winter in houses from which the cold is only just excluded. As a greenhouse or cool conservatory tree the Orange has few equals. It is of rather slow growth, does not need frequent repotting, and, being naturally of symmetrical habit, can be kept in bounds by a very little pruning. The soil should consist of good turfy loam three parts, cow manure one part, and enough grit, such as road scrapings, to keep the whole porous. The plants should be potted firmly, and the drainage must be free. Splendid little specimens of the Otaheite Orange (Citrus Aurantium japonica) can be grown in 6″ pots, but for the larger specimens stout wooden tubs are the best. These are preferably constructed of Teak or Oak, and strong handles should be attached for convenience in moving. Plenty of water and liquid manure must be given throughout the summer; in autumn and winter much less will be required. The plants may remain in the same pots for years, providing a good top-dressing of the same material as that recommended for potting be given annually. The spring is the best time to do this. All the pruning needed is to shorten any branches that threaten to destroy the balance of the tree. Trained specimens in large tubs are occasionally closely pinched in, to foster a close and rather formal growth; the natural habit is better. Oranges are very dirty subjects, and thus, in addition to daily syringing in the summer, the leaves must be sponged two or three times during the winter. Sponging with skimmed milk imparts a gloss to the leaves, and a little soft soap dissolved in tepid soft water is an excellent cleanser.

To Rehabilitate Sickly Specimens:—

When the normal green of the foliage gives place to a yellow hue, it is an unfailing sign of

ill health. Spring is a good time to take sickly trees in hand. Under greenhouse cultivation they generally begin to grow in March. The roots should then be examined, and, if necessary, the old soil shaken away, dead roots cut out, the ball reduced slightly and repotted into a smaller pot. The head should be cut back at the same time. The plants should then be taken to an intermediate house, plunged in gently fermenting material, and the syringe plied regularly twice a day. Under such conditions growth will speedily be made, unless the plant is in a hopeless condition. Gradual hardening off must precede removal to the cooler quarters.

Oranges as Dessert Fruits:

The fruits upon trees grown in cool houses for decorative purposes are always pithy, and rarely

THE SEVILLE ORANGE (*See* CITRUS AURANTIUM VULGARIS, *p.* 216, VOL I.).

palatable, but if more heat be given, superbly flavoured produce is obtained. A light, span-roofed house, preferably with facilities for giving bottom heat, is to be preferred. The plants may be either grown in pots or planted out. The cultural routine is briefly as follows: A start early in the year so as to induce flowering in February; bottom heat 70° to 75°, and an atmospheric day temperature of about 60° for spring, rising as the days lengthen; in summer no artificial atmospheric heat is required as long as the 70° to 75° of bottom heat can be kept up; plenty of water, and liquid manure while the fruit is swelling; fruit gathered in from nine to eleven months; and a winter minimum temperature of 45° to 50°, with comparatively little water, for this is the period of rest.

A Selection of Dessert Varieties:—

[NOTE.—These can all be grown as decorative plants in cool houses, but the fruit will be of little use. (*See also* CITRUS.)]

Maltese Blood, large, very rich, pulp dark red, skin dark red to yel.
Navel, or Embiguo, large, rich, and juicy, skin yel. to yellowish red. Largely grown in America.
St. Michael's, rather variable in thickness of skin.
Silver Orange, skin thin, pale yel., flesh very pale.
Sustain, large, very rich and juicy.
Tangerine, very variable, but flavour always rich and sweet.

For Decoration:—

Otaheite (Citrus Aurantium japonica), Kumquat, 3′ to 6′, fruits deep orange yel. skin, 1″ to 1½″ diameter, good for pots, window boxes, and small houses.
Variegated, lvs. margined wh., fruits oval, yel., striped grn., of good flavour.

ORANIA.

Tall-growing stove Palms (*ord.* Palmæ), with strong, closely ringed stems, surmounted by a thick head of huge leaves. Imported seeds will germinate fairly well if sown in brisk and well sustained bottom heat. Soil, sandy loam which has been stacked with cow manure. Plenty of water is needed at all times. The Oranias, although easy to grow, and of noble presence, are rarely included in collections.

Principal Species:—

macrocladus, 40′, lvs. pinnate.
nicobarica (*see* Bentinckia nicobarica).
philippinensis.
regalis, lvs. 6′ to 7′ long, fruits red.

ORBIGNYA.

A small genus (*ord.* Palmæ) of stove Palms, very rarely grown, closely allied to Jubæa. Lydiæ and Sagotii are grown at Kew.

ORCHARD.

When planting an orchard, the two points which have to be first considered are the soil and situation. Very few soils are wholly unsuitable, but the best results are obtained from well-drained soils of good depth, and inclining to be retentive. Land that will make good bricks will grow good Apples, is a remark often quoted, and it may be applied to Orchard fruits generally, with the reservation that a little more lime is needed for stone fruits. If this is lacking the deficiency should be made up. (*See* LIME.)

The site intended for planting should be open towards the south-east, south, south-west, and west, and sheltered, if possible, from the east, north-east, north, and north-west. The gradient of the slope is immaterial as far as the fruit is concerned, although if more than one in thirty cultivation is not easy. An elevation of about 500′ above sea level is the best, as this is high enough to escape the late spring frosts, which are destructive in the low-lying, damper valleys, while it is not high enough to be too bleak. Artificial shelter may be provided by planting quick-growing trees, such as Lombardy Poplars and various Conifers. Boggy, stagnant ground must be drained, other-

Orange Rust (*see Roses*).
Orange Thorn (*see Citriobatus*).
Orbea (*see Stapelia*).

wise the trees will dwindle and die, a prey to lichen, insect pests, and canker. It is a mistake to plant young trees on the site occupied by old ones, without thorough preparation of the soil. Such preparation usually means digging holes at least 3′ deep, and 2′ wider than the spread of the roots, and planting in fresh material. This demands a good deal of labour, but without it the young trees will not flourish.

Time and Manner of Planting.—Generally speaking, the best time to plant trees is about the end of October and the beginning of November, for the soil is still warm and moist, so that cut roots soon heal, and produce fresh fibres. Any time from the end of October until the beginning of March will do, and the actual time will depend as much upon the convenience of the planter as upon the state of the weather and condition of the ground. Planting in frosty weather is undesirable, and it is folly to attempt it during a wet spell. The stems of standard orchard trees should be 5′ to 7′ in height clear from the ground. The space given to them varies considerably. As much as 30′ between the trees is recommended in some cases, but on an average about 25′ is enough. Or they may be planted 10′ to 15′ apart, and alternate trees taken out as growth calls for more space. A favourite market method is to give plenty of room between the standards, and crop between with Gooseberries, Currants, and even Raspberries and Strawberries. Under this system little ground is allowed to remain idle. With bush or dwarf trees, *i.e.* trees worked upon dwarfing stocks, from 6′ to 9′ should be allowed each way. Planting at 6′ apart is quite common, but there is scarcely room enough. A variant is to plant 4′ apart, and lift alternate trees as space is required. Those which are taken out may be used to extend the orchard.

On Grass and Arable Land.—Broadly, orchards are divided into two sections—one, in which the land between the trees is laid down in grass, and the other in which the soil is kept tilled, and cropped with small fruits, or other crops. Even in grass orchards a radius from the trunk equal to the spread of the branches should be kept clear of grass and weeds for at least the first six or seven years after planting. Afterwards it will not matter so much. Many growers have neglected this item, and suffered accordingly. Grass orchards should not be laid down to hay, but they may advantageously be grazed by cattle. In this case, however, the trees should be protected by wire or other guards.

Pruning, Manuring, and Insect Pests.—Comparatively little pruning is needed by Orchard trees, for a natural expansion of head is allowed. Each year, however, the trees should be examined, and crossing branches cut out, dead wood removed, sucker-like growths taken from the centre, and the branches so disposed as to admit light and air to the centre of the trees. For moss, use the potash or lime solution recommended under INSECTICIDES. Under that heading also will be found instructions for dealing with other insect pests. (For canker, *see* CANKER.) While organic manure should not be mixed with the soil in which young trees are planted, it may be applied subsequently in the form of mulchings of yard manure. The stuff should not be merely put round the bole, but laid on in a coating as far as the branches extend. The following mixture will also help the trees immensely if they are carrying crops:—

5 parts superphosphate or bone meal. 3 parts kainit. *1 part sulphate of iron.	Mix thoroughly, and apply at the rate of 4 oz. per sq. yd.

* This to be left out if there is iron in the soil.

Excellent results may also be obtained by muriate of potash at the rate of 1¾ lb. per sq. rod. For light soils, agricultural salt may be applied early in April at the rate of from 2½ lb. to 3 lb. per sq. rod. Bone meal is first rate for heavy land; use 3 oz. to 4 oz. per sq. yd. Liquid sewage, and swillings from stables, are invaluable in winter, and when the trees are in bloom, and onwards. Further particulars will be found under MANURES.

Kinds and Varieties.—Apples, Pears, Cherries, Plums, and Damsons are all commonly grown in orchards, and to a much less degree Nuts, Medlars, and Quinces. When selecting varieties, it is a safe plan to look round the neighbourhood and note what sorts are doing well, and what badly, and act accordingly. Helpful selections of varieties will be found under the respective headings of the kinds referred to above.

ORCHARD HOUSE.

A glasshouse devoted to the accommodation of a collection of the hardier fruits, the principal kinds being Apples, Pears, Plums, Cherries, Peaches, and Nectarines, and thus distinct from houses exclusively set aside for Grapes, Peaches, Nectarines, or Figs. The trees may be grown in pots, or they may be planted out, or planted-out and pot trees may be included in the same house. The compromise is, however, not to be recommended for span-roofed houses.

Structure and Heating.—Span-roofed houses are always the most convenient, but lean-to and hip-roofed houses are suitable. In these cases the back wall may be covered with Peaches, or Nectarines, or Roses, but the roof area should be left untenanted. As an orchard house should be a cool house, and its function rather to shelter than to force into early growth, the ventilation must be free. Top and side ventilators should always be furnished, so that a reasonably cool temperature may be kept up during the summer. On the other hand, hot-water pipes should always be fixed, as the usefulness of the house is increased at least 100 per cent. thereby. An unheated house is not to be trusted, and it will be almost useless during very sharp weather. For a lean-to house 10′ in width, a single flow and return of 4″ piping will be sufficient. For a span-roof house of 14′ width, the pipes should run all round. If it is intended to plant out trees, the borders should be constructed to suit the prospective occupants. Sweet Cherries trained cordon fashion are the most suitable fruits for training along the roof, if it is decided to use the roof to some extent.

Fruit Trees in Pots.—Of late years great progress has been made in the cultivation of hardy fruits in pots under glass. There are two or three advantages in this system of culture. They are (1) earlier and finer fruit than can be obtained outdoors; (2) a greater certainty with regard to crop, as the trees are sheltered from spring frosts at critical times, especially when in flower and setting for fruit; (3) a great number of varieties and much fruit in a small space. It has become fashionable to send the fruit, especially Plums and Cherries, to the table upon the trees, and where the owner desires that this should be done, an orchard house

is a necessity. Increased labour for frequent waterings of pot trees is a necessity, for the success of pot trees depends in great measure upon the attention paid to watering.

Management.—During the winter months, the frost should only just be kept out of the house, for the pot trees must have a similar rest to those in the open. The higher mean temperature will, however, result in an earlier blooming, and it is at this time, when fairly sharp frosts are to be expected, that the hot-water pipes will be found useful. Artificial pollination must be effected by brushing the flowers. The alternatives to this are (1) opening the ventilators widely on bright days to let the bees in, and (2) taking a hive of bees into the house; this is bad for the bees, but good for the flowers. If desired, the trees may be stood out of doors all the summer, and it is advisable that lightly cropped trees should be thus treated. Experienced cultivators have their trees so well in hand that they rarely fail to get a crop, but it is advisable to have a larger number of trees than the house will hold, so that it can be filled only with those well set with flower buds. The others can be left out all the winter, and they will need but very little water. The pots must, however, be plunged over the rims in coal ashes, or frost will split them. The ashes may well be covered with Bracken or straw litter. In early spring ventilation must be free, but not such as to cause cold draughts, which are very injurious. All through the summer plenty of air must be given, and from the beginning of June until frosts threaten in autumn the house should be wide open by night as well as day. Later on, as the fruit begins to ripen, the ventilators should be netted over to prevent the ingress of birds; if wasps attack, muslin may be used. Heavy fruits may require to be supported with net bags. Re-potting is best done after the fruit has been gathered, but before the leaves have dropped. (For further particulars of pot fruit trees, *see* PEACH.) Not only will the trees, from which the fruit has been gathered, be all the better for a sojourn outdoors to complete the ripening of the wood, but the house is thus set free for sheltering Chrysanthemums, or other tender plants requiring protection from the early autumn frosts. Indeed, the orchard house may well be used as a shelter-house for tender plants until the New Year. The buds of the trees seem to start all the more freely if they have been exposed to a little frost.

ORCHID HYBRIDISATION.

The initial process is analogous to dusting the stigma of a Lily with pollen. In Orchids, however, neither stigma nor pollen is so evident as in Lilies or most other flowers. The sexual organs are combined into the central portion of the flower, known as the column, and this is so situated in conjunction with the labellum as to prevent self-fertilisation in the majority of cases, and encourage cross-fertilisation by insect agency (*see* ORCHIDS). A very large number of Orchids exude nectar at the base of the column, and in search of this an insect has to proceed in a direction and manner that ensures the transference of any pollen masses it may have on its back or head to the sticky stigmatic surface, and also the displacement of the pollen masses in the same flower, which, sticking to the retiring insect, are carried on for the fertilisation of the next flower visited.

In a Cattleya bloom the prominent column is more or less curved forward, and may be slightly channelled on the lower face. At the tip is the modified anther, consisting of a thin membrane or cap, under which are the pollinia or pollen masses, four in number, each mass composed of many pollen grains. Just below the pollen masses is a small area which exudes a sticky substance when the pollinia are ripe for their mission, and a little further down is the stigmatic surface. In backing out of such a flower an insect large and strong enough to reach the nectar will press its back against the sticky matter, and the pressure, the movement, and the gum will combine to dislodge the pollen masses and cause them to adhere to the retreating insect. The contrivances adopted by Orchids to ensure cross-fertilisation are many and wonderful, the above being a very simple example.

Artificial hybridisation or cross-fertilisation consists in transferring the pollen masses by hand, or rather by the aid of a pointed stick, pencil, or camel-hair brush, to the stigmatic surface. It should always be done with a definite object in view, such as the creation of new shades or combinations of colours, modification of form, robust habit, freedom of flowering, etc., and only the finest forms of the species operated upon should be used, or the resulting hybrid may, after years of patient care, be scarcely worth house room. Hybridisation merely with a view to securing a certain combination of two species is itself of little value, but when intelligently conducted it is the means of creating beautiful plants. Fortunately, artificially raised Orchid hybrids have almost invariably proved to be of easy culture, and in this respect are often a great improvement upon the weaker or more delicate parent.

Not only have hybrids been raised between species of one genus, but in several instances two genera have been combined, and there are now such hybrids as Cattleya × Lælia, Sophronitis × Lælia, Sophronitis × Cattleya, Epidendrum × Cattleya, Epidendrum × Sophronitis, Epidendrum × Lælia, Phaius × Calanthe, and Zygopetalum × Colax. Bigeneric hybrids may also be crossed with a member of a third, but allied, genus, an instance being Lælio-Cattleya elegans × Sophronitis grandiflora, the product of which is registered as Sophro-lælio-cattleya Veitchii. In some Orchid genera no hybrids have been raised artificially; at least, none have been flowered and registered as such among Brassia, Cœlogyne, and Habenaria.

The record of Orchid hybridisation forms a most interesting page of horticultural history, but there is not room in this work to do more than briefly refer to a few points in it. Dean Herbert recorded his own efforts at cross-breeding in this natural order in 1847, but it was not until about 1853, when, at the suggestion and under the instruction of Mr. J. Harris, of Exeter, Mr. John Dominy entered heartily into the work, that Orchid hybridisation was commenced in earnest. From 1853 to about 1866 he worked on behalf of the Messrs. Veitch, at Exeter, and subsequently at Chelsea. In 1866 Mr. John Seden commenced, and from then up to the present time he has been producing for the same firm Orchids of the greatest beauty. Meanwhile, other hybridists have entered the field, the list including such well-known names as Sander, Cookson, de Barri Crawshay, Linden, Lawrence, Maron, Bleu, Mantin, Cypher, Charlesworth, Chapman, Ingram, Maynard, and Hollington. So far the greatest successes have been achieved with

CATTLEYA WARSCEWICZII: A CHOICE AND BEAUTIFUL SPECIES.

UNIV. OF
CALIFORNIA

Dendrobiums, Calanthes, Cattleyas, Lælias, Lælio-Cattleyas, Masdevallias, Phaises, Phalænopses, and Cypripediums.

ORCHIDS.

In one of the great natural divisions of the vegetable kingdom, the Monocotyledons, no order is more interesting than Orchidaceæ. It does not possess great economic value such as attaches to the Cereals (Gramineæ) or the Palms (Palmæ); indeed, excepting Vanilla and some Orchises, the order contributes scarcely anything to foods, fibres, or drugs. But by the beauty, grace, wonderful colouring, and marvellous form or quaint habit of its many members it appeals to almost every horticulturist, and is represented in nearly every plant collection in the land.

Orchids are among the latest additions to the world's plants, standing very high in the scale of evolution. They are the aristocrats of the plant world. The great essentials in which Orchids differ from other plants in the same division are found in the combination of stamens and pistil into one body, the column; the suppression of all but one anther, excepting in the large tribe of Cypripedieæ, in which there are two; the peculiar structure of the pollen, which is in masses rather than in free grains; the irregularity of the flowers; and the remarkable form and development of the third inner segment, known as the lip or labellum.

The sepals may be joined at the edges, as are the two lower ones in Cypripedium, or they may all three be coherent as in Masdevallia. The lip may be by far the largest segment, as in most Oncidiums; exquisitely fringed, as in Lælia digbyana and Dendrobium brymerianum; prominently spurred, as in Angræcum sequipedale; pouched, as in Cypripedium; or diminutive, as in some Masdevallias. In mode of inflorescence Orchids show much diversity; the flowers may be either solitary or in spikes, racemes, or panicles, and these may be erect, drooping, arching, or pendent.

Orchids differ as widely in habit as in their flowers and inflorescence. Some, like Grammatophyllum speciosum or Bulbophyllum Beccarii, make huge plants many feet high, while on the other hand they may be so minute—as in Eria extinctoria—as to be scarcely discernible amid the moss in which they grow. Some have a creeping growth, as the Cœlogynes; some are climbers, as the Vanilla; some are erect and stiff, as in most Dendrobiums and Grammatophyllums; while others grow head downwards, as Cattleya citrina and Scuticaria Steelii. They may be found growing on limestone rocks, where, at high tide, the spray must often reach them; they nestle amid the moss in a tropical jungle, and may be found among other herbage on an English down; they may be found on branches of trees in the hottest and moistest parts of the globe, and also high up the mountains of the tropics, close to the snow line. Orchids are as widely dispersed as they are variable, though they are most numerous in tropical countries, and are chiefly epiphytal (on trees).

For botanical purposes, the natural order has been divided into five large tribes, and these, with their principal genera, are (1) EPIDENDREÆ—Cattleya, Calanthe, Dendrobium, Epidendrum, and Lælia; (2) VANDEÆ—Aërides, Odontoglossum, Oncidium, Phalænopsis, and Vanda; (3) NEOTTIEÆ—Ancectochilus, Sobralia, and Vanilla; (4) OPHRYDEÆ—Aceras, Disa, Ophrys, and Orchis; (5) CYPRIPEDIEÆ—Cypripedium, Selenipedium, Neuwiedia, and Apostasia.

According to Willis's "Flowering Plants and Ferns," there are 400 genera and about 5,000 species of Orchids known to science, but probably not more than 2,000 species are, or have been, in cultivation. The national collection at Kew contains 203 genera and about 1,800 species, and some idea of the increasing interest taken in Orchids of late is shown by the fact that the Kew collection contained only 638 species in 1864. Even allowing that in some other public and private collections there are species not represented now at Kew, the limit of 2,000 cultivated species does not seem too severe.

For particulars of culture and selections, see the various genera.

ORCHIS.

Beautiful or curious terrestrial Orchids (*ord.* Orchidaceæ), most of which are hardy in this climate, but a few are rather tender in the open. They like a rich, light soil, and those which grow naturally on calcareous soils should have chalk or lime added. They are best left alone as a rule, although the fine variety of maculata is improved by occasional removal to fresh soil. Propagation is by division in autumn, the best time to transplant also.

Principal Species and Varieties :—

foliosa, 2½′, My., pur.; very handsome and hdy.
latifolia, 1′, Je., pur., red. Marsh Orchis.
— alba, wh.
— Glasnevin var., tall spikes, pur., spotted blk.
maculata, 1′, Je., pur., wh.
— superba, My., Je., mauve, very fine.
purpurea, 1′ to 2′, My., pur., ro.

Other Species :—

hircina, 1½′, sum., grn., wh. Lizard Orchis.
laxiflora, 1′ to 2½′, sum., pur.
longibracteata, My., pur.
longicornu, 1½′, My., pur.
longicruris, My., pur. (*syn.* undulatifolia).
mascula, 1′, spr., pur.
militaris, 1½′, spr., pur. Soldier or Military Orchis.
Morio, 6″ to 9″, sum., pur. Green-winged Meadow Orchis.
pallens, 9″, My., pale yel. (*syn.* sulphurea).
papilionacea, 1½′, Ap., pur. (*syn.* rubra). Butterfly Orchis.
pyramidalis, 1′, sum., ro., pur.
— alba, wh.
sambucina, 9″, Ap., yel.
spectabilis, 6″, My., pur., wh.
tridentata, 9″, My., pale pur.
ustulata, 6″ to 9″, spr., dark pur.

ORDER, NATURAL.

A group or family of plants next in importance to a class, and above a genus or tribe. Each order or family consists of a number of more or less closely related genera, and the orders again are grouped according to affinity under the superior

Orchidantha (*see Lowia*).
Orchidium (*see Calypso*).
Orchidocarpum (*see Asimina*)

Orchis, Bee (*see Ophrys apifera*).
Orchis, Fly (*see Ophrys muscifera*).
Orchis, Humble-Bee (*see Ophrys bombilifera*).
Orchis, Lizard (*see Orchis hircina*).
Orchis, Marsh (*see Orchis latifolia*).
Orchis, Military (*see Orchis militaris*).
Orchis, Spider (*see Ophrys aranifera*).
Ordeal Bean of Old Calabar (*see Physostigma*).
Ordeal Tree (*Cerbera Tanghin*).

"class." The great Swedish botanist Linnæus, who gave his name to the Linnæan system of plant classification, arranged plants into twenty-four "classes," according to the number and arrangement of the stamens in the flower. The orders belonging to these classes were arranged according to the number of carpels. Thus a plant with one stamen would be placed in the class Monandria, and if it also had one carpel it would be placed in the order Monogynia.

This artificial grouping has given way to the "natural" system, by which plants are arranged according to their affinities, distinct features running through all the plants placed in an order. Thus in Cruciferæ four petals are arranged in the form of a cross; in Leguminosæ the fruit is a special kind known as a "legume"; in Compositæ are found heads containing many flowers, and the stamens united by their anthers, and so on. This natural method of classification has entirely superseded the artificial Linnæan system.

OREODOXA.

Noble stove Palms (*ord.* Palmæ) of easy culture, and answering to the same general treatment as the stove Phœnixes, except that they like a little peat with the soil. Regia is the species usually grown for decorative purposes, and, where it can be given a fair amount of room, there is no more graceful Palm. It does fairly well plunged out of doors in the sub-tropical garden during the summer, but it must have a sheltered corner. Oleracea is the Cabbage Palm, the young leaves of which in bud form constitute the "cabbage" which is esteemed such a delicacy in the West Indies. Granatensis is excellent for table decoration when young, but it gets rather coarse with age. Sancona is remarkable for its reddish bronze leaf petioles; it is a favourite decorative subject upon the Continent. The leaves of all the species are pinnate or pinnatisect.

Principal Species:—

oleracea, 100′, lvs. pinnate, 4′ to 6′ long. Cabbage Palm.
regia, lvs. pinnate, 3′ to 6′ long.
Sancona, leaf stalks reddish bronze when young.
ventricosa of gardens (now Gaussia Ghiesbreghtii).

OREOPANAX.

A large genus of stove shrubs or trees (*ord.* Araliaceæ). Propagation is by cuttings of the young shoots, in heat, preferably in spring. Soil, good loam three parts, leaf mould one part, and sand. Plenty of water is wanted in the growing season, little in winter. The species here enumerated are chiefly to be found in botanic establishments.

Principal Species:—

andreanum, warm grh., flowers in heads in a tall, erect raceme, lvs. elliptic.
capitatum, 12′, st., lvs. elliptic (*syns.* Aralia and Hedera capitata).
dactylifolium, st. or warm grh., lvs. palmate.
epremesnilianum, lvs. digitate; most probably a var. of dactylifolium.
jatrophæfolium, grh., lvs. palmate (*syn.* Aralia jatrophæfolia).
peltatum, warm grh., flowers greenish wh., lvs. roundish, heart shaped.
platanifolium, warm grh., flowers wh., lvs. seven lobed (*syns.* Aralia and Hedera platanifolia).
sanderianum, warm grh., lvs. large and handsome.
Thibautii, Nov., warm grh., grn. (*syn.* Aralia Thibautii).
xalapense, 6′, Ap., grh. shr., grn. (*syns.* Aralia and Hedera xalapensis, and Monopanax Ghiesbreghtii).

Orelia (*see Allamanda*).
Oreodaphne (*see Ocotea*).
Oreodaphne (*of Nees, see Umbellularia*).

ORGYIA. (Vapourer Moth.)

The Vapourer Moth (Orgyia antiqua) is a common and injurious insect. Its larvæ, which frequently reach 2″ in length, are covered with black and yellow hairs, and prey upon many deciduous trees and shrubs. The male insect is small, and has a dark brown body with rusty brown wings, and clouded with darker brown on the forewings. The female is almost wingless, the wings being reduced to tiny, scale-like processes on either side of the body. When fully fed the larva spins a grey brown silken cocoon, which may frequently be found amongst the leaves of the shrubs it infests. The female emerges in autumn, and lays her eggs upon the cocoon. The larvæ are hatched in spring.

Hand picking both larvæ and cocoons, whenever they can be seen, is the best remedy.

ORIGANUM. (Marjoram.)

About twenty-five species of hardy sub-shrubs and herbaceous perennials (*ord.* Labiatæ). Few of the species are of great garden value save the Sweet Marjoram, whose culture is detailed under the head of Marjoram. Vulgare has also aromatic properties, but they are rarely turned to account. Seeds, cuttings of the young, flowerless shoots, and root division are all available methods of propagation. The undermentioned species are worthy of attention.

Principal Species and Varieties:—

Dictamnus, 1′, sum., hdy. sub-shr., pk. Needs a little protection in cold places.
Majorana, 1′ to 2′, sum., hdy., pur. or wh. (*syns.* majoranoides and Majorana hortensis). Sweet Marjoram.
microphyllum, 1′, Je., hdy. sub-shr., pk. (*syn.* Maru of Sibthorp).
Onites, 1′, sum., hdy. sub-shr., wh. Pot Marjoram; Onites of Lam.
sipyleum, 1′ to 1½′, sum., hdy. procumbent sub-shr., pk. (*syn.* hybridum).
Tournefortii, 1′, Aug., hdy. sub-shr., pk; Dittany of Amorgos.
— pulchellum.
vulgare, 1′ to 2′, sum., hdy., pur. British. Common or Wild Marjoram.
— album, wh.
— aureum, spr., yel. A pretty var.

ORMOCARPUM.

Shrubs (*ord.* Leguminosæ) requiring intermediate house treatment. Propagation, by cuttings of half ripened growths in sandy peat. Soil, fibrous loam and peat.

Principal Species:—

sennoides, 3′, sum., wh. (*syn.* Diphaca cochinchinensis).

ORMOSIA.

Stove evergreen trees (*ord.* Leguminosæ), allied to Sophora. Propagation, by cuttings in sand,

Orcophila (*of Nuttall, see Pachystima*).
Orithalia (*see Agalmyla*).
Orithyia (*see Tulipa*).
Orixa (*see Celastrus*).

beneath a bell-glass, over bottom heat. Soil, three parts fibrous peat, one part loam, and sand.

Principal Species :—

coccinea, 10′, Jy., bl. dasycarpa, 10′, Jy., bl.

ORNITHIDIUM.

Small Orchids (*ord.* Orchidaceæ) with pretty but not very effective flowers. They have a creeping habit, and may be propagated by division when new growth commences. They succeed in an intermediate house, fixed to blocks of wood or even to virgin cork, with a little fibrous peat and sphagnum about the roots. Give water freely at all seasons.

Principal Species :—

coccineum, 6″, Jy., crim. (*syn.* Cymbidium coccineum).
densum, 3″, sum., wh., pur. (*syn.* Maxillaria densa).
Sophronitis, 3″, sum., red.

Other Species :—

album (now Camaridium ochroleucum).
nanum, 2″, spr., yellowish.
ochraceum, 3″, sum., yel., pur., wh.
strumatum, 3″, spr., wh.

ORNITHOCEPHALUS.

A genus of about twenty species of tropical American Orchids (*ord.* Orchidaceæ) scarcely any of which are of horticultural value. The one sometimes cultivated—grandiflorus, 6″, June, white and green—is best grown in a small pan suspended near the roof in an intermediate house, using peat and sphagnum as compost.

ORNITHOCHILUS.

Probably only two species constitute this genus (*ord.* Orchidaceæ), and both are of small growth. They do best in baskets, in peat and sphagnum, suspended in a moist stove.

Principal Species :—

fuscus, 8″, aut., brownish yel., striped pur. (*syn.* Aërides difforme).

ORNITHOGALUM. (Star of Bethlehem.)

Hardy and greenhouse bulbous plants (*ord.* Liliaceæ). Propagation, by offsets and seeds. Soil, sandy loam for the hardy species, and loam and peat for the tender ones. Nearly all succeed as pot plants, the taller growers lending themselves to this mode of culture. A warm border is best for the hardy forms.

Ornithogalum arabicum.

Principal Species and Varieties :—

arabicum, 2½′, sum., grh., wh., ovary blk., fragrant (*syn.* corymbosum, *see* figure).
biflorum, 1½′, Ap., grh., greenish wh. (*syn.* chloroleucum).
lacteum, 2½′, Je., wh. (*syn.* conicum).
longebracteatum, 2′, My., grh., greenish wh. There is a variegated form.
nutans, 1′, spr., hdy., wh. — boucheanum, a fine var.
pyrenaicum, 2′, Je., hdy., yel., grn.
Saundersiæ, 3′, sum., wh., tinged grn. at back.
thyrsoides, 1½′, Je., grh., yel. A variable species, having several vars., of which aureum and flavissimum are the best.
umbellatum, 1′, My., hdy., silvery wh., grn. and wh. reverse. Leichtlinii and splendens are charming forms.

Other Species :—

anomalum (now Drimia anomala).
capitatum, 1′, Je., grh., wh. (now Urginea capitata).
caudatum, 3′, My., grh., wh., grn.
chloroleucum (*see* biflorum).
conicum (*see* lacteum).
corymbosum (*see* arabicum).
Eckloni, grh.
fimbriatum, 8″, Feb., Mch., hdy., greenish wh.
graminifolium, 1′, Jy.,

Ornitharium (*see Sarcochilus*).

hlf-hdy., wh. (*syn.* juncifolium).
Haussknechtii, 3″, spr., hdy., wh.
latifolium, 1½′, Je., hdy., wh., grn.
montanum (*see* figure).
narbonense, 1½′, spr., hdy., cream, wh.
— pyramidale.
niveum, 6″, My., grh., wh.
revolutum, 1′, My., grh., wh.
tenuifolium, 1′, Ap., wh.
unifolium, 6″, Je., greenish wh.
vittatum, 10″, Je., grh., yel., grn. reverse (*syn.* Albuca vittata).

ORNITHOGLOSSUM.

Greenhouse bulbous plants (*ord.* Liliaceæ). Propagation, by offsets. Soil, loam, leaf mould, and sand.

Principal Species :—

glaucum, 6″, Dec., greenish br. (*syns.* Cymation lævigatum, Lichtensteinia lævigata, and Melanthium viride).
undulatum, 6″, Sep., pur., grn. (*syns.* undulatum and Lichtensteinia undulata).

ORNITHOPUS.

Hardy annuals (*ord.* Leguminosæ). Propagation, by seeds in the open in March and April. Soil, ordinary garden mould.

Principal Species :—

ebracteatus, 6″, Jy., yel., red.
perpusillus, 6″, Je., wh., red.
repandus, 6″, Jy., yel.

OROBUS. (Bitter Vetch.)

Hardy herbaceous perennials (*ord.* Leguminosæ). Propagation, by seeds and division. Soil, deep sandy loam. Most of the species make good pot plants, and will stand gentle forcing. This genus is now united to Lathyrus by botanists, but is referred to separately for garden reasons.

Principal Species :—

aurantius, 1½′, Je., or. yel. (correctly Vicia aurantia).
filiformis, 1½′, My., wh., tinged bl. (*syn.* canescens).
pannonicus, 1′, My., wh. and ro., wh. and pur., or pur. and yel.
vernus, 1′, spr., pur., bl. There are several vars.

ORONTIUM.

Hardy perennial aquatics (*ord.* Aroideæ). Propagation, by division. Soil, loam in baskets sunk in water.

Principal Species :—

aquaticum, 6″, My., grn.
japonicum (now Rohdea japonica).

Photo: D. S. Fish, Edinburgh.

Ornithogalum montanum.

OROXYLON.

A tall stove tree (*ord.* Bignoniaceæ). Propagation, by imported seeds, or by cuttings, in strong heat. Soil, fibrous loam, leaf mould, and sand. An abundance of root room and a good deal of water are essential.

Principal Species :—

indicum, 40″, sum., pur., wh. (*syn.* Calosanthes indica).

ORPHANIDESIA.

Orphanidesia gaultherioides is a hardy shrub (*ord.* Ericaceæ), of dwarf habit; rarely cultivated. Propagation, by cuttings and layers. Soil, fibrous peat and loam; ordinary garden soil is hardly suitable.

Ornithopteris (*see Pteris*).
Ornithoxanthum (*see Gagea*).
Ornitrophe (*see Schnidelia*).
Ornus (*see Fraxinus*).

Orothamnus (*see Mimetes*).

ORPHIUM.

Greenhouse shrub (*ord.* Gentianeæ). Propagation, by cuttings in sandy peat beneath a bell-glass. Soil, three parts fibrous peat, one part fibrous loam, with coarse sand.

Principal Species :—

frutescens, 1½′, Jy., red (*syns.* Chironia angustifolia of *Botanical Magazine* 818, C. decussata of *Botanical Magazine* 707, and C. frutescens of *Botanical Magazine* 37).

ORTGIESIA.

Greenhouse or stove perennials (*ord.* Bromeliaceæ). Propagation, by suckers. Soil, light fibrous loam and leaf mould.

Principal Species :—

tillandsioides, 1′, aut., red.

ORTHOCARPUS.

Half-hardy annuals from California (*ord.* Scrophularineæ). Propagated by seeds in light soil over a hotbed. Plant in light, rich soil and a warm situation.

Principal Species :—

erianthus roseus, 1′, Je., creamy wh. to pur. (*syn.* Triphysaria versicolor).
purpurascens, 6″ to 12″, sum., crim., pk., or pur.

ORTHOCERAS.

A genus of small Orchids (*ord.* Orchidaceæ), from Australia and New Zealand. They are terrestrial species, propagated by division, and best grown in a cool greenhouse under conditions similar to those suitable for Disas.

Principal Species :—

strictum, 1½′, aut., greenish yel.

ORTHOSIPHON.

Greenhouse and stove herbaceous or shrubby perennials (*ord.* Labiatæ). Propagation, by division for the former, and by cuttings for both. Soil, fibrous peat and sandy loam.

Principal Species :—

incurvus, 1′, My., st. ev., red.
shr., pur. (*syn.* virgatus).
rubicundus, 1′, Je., grh.
stamineus, 2′, Jy., lil.

ORYZA.

Stove Grasses (*ord.* Gramineæ), whose value lies in their economic rather than in their horticultural properties. They may be readily grown in a stove, in pots or pans of loamy soil that are placed in or under warm water when growth is vigorous. The chief species is sativa, which produces the Rice of commerce, a cereal in common use in this country, and one of far more importance than Wheat in many large areas of China, India, and the East Indies.

OSBECKIA.

Stove deciduous and evergreen shrubs (*ord.* Melastomaceæ). Propagation, by cuttings of firm shoots in sandy peat, beneath a bell-glass over bottom heat. Soil, fibrous peat, sandy loam, and a little dry manure.

Principal Species :—

aspera, 2′, Jy., red or pur.
chinensis, 2′, Jy., pur.
nepalensis, 2′, Je., ro. pur.
— albiflora, wh.
octandra, 1½′, Ap., ro. (*syn.* Melastoma osbeckioides).
parvifolia, 2′, Aug., ro., yel. (*syn.* zeylanica).
stellata, 2′, Aug., pk.

Other Species :—

rostrata, 1½′, Je., ro. pk.
rubicunda, 1½′, Jy., pur.
umlaasiana (now Dissotis incana).
wightiana, 1½′, sum., pur.

OSIER.

The long, slender, and flexible growths of the commonest of English Willows (Salix viminalis) are known commercially as Osiers, but the same title is given to other species of Willow when grown in the same way as the Common Osier. It is in the manufacture of hampers and, indeed, nearly all basket and wicker work that these Willow wands are so valuable. The smaller growths frequently serve a different purpose, being utilised by market growers in bunching Greens, Turnips, Carrots, etc., in making up bundles or rolls of Celery, Rhubarb, and Leeks, and even for fastening fruit trees to stakes. Osier cultivation is not a difficult matter by the sides of rivers and streams, or wherever an abundance of moisture is at hand, provided the soil is not clayey or sour. Alluvial soil that is just flooded at high water is the best that can be selected, and familiar examples are found in the Osier beds of the Thames and Severn valleys, and the Osier holts of the Fen districts. The land is first cleared and broken up, and then, in February, cuttings about 1¼′ long are planted 1′ to 1½′ apart, in rows 1½′ to 2′ asunder; too much room should not be given, or the Osiers will not be as long, slender, and unbranched as the grower would wish. After planting, little attention is necessary beyond weeding the first season, and the annual cutting down of growth after leaf fall.

If brown Osiers are needed, the growths are dried and stacked, after sorting, but for white or peeled Osiers the rods are placed upright with their bases in a few inches of water, in a sort of ditch, where they remain until they commence to blossom, when they are removed and peeled.

The chief Osiers are the Common (Salix viminalis), Fine Basket (S. rubra forbyana), Golden (S. alba vitellina), Ornard (S. rubra), and Spaniard Rod (S. triandra).

OSMANTHUS.

Hardy and half-hardy evergreen shrubs (*ord.* Oleaceæ). Propagation, by cuttings in sandy peat, or by grafting. Soil, fibrous loam and sand.

Principal Species and Varieties :—

americanus, 6′, Je., wh.
Aquifolium, 4′, Aug., wh.; a handsome shr.
— illicifolius, a distinct var., represented by broad - leaved, pur.-leaved, and wh. variegated forms, all of which look well in large beds or masses; myrtifolius is a spineless form.
fragrans, 8′, sum., wh. (*syn.* Olea fragrans). Useful for pot culture on account of its delightful perfume. Not quite hdy. in cold districts.

OSMITES.

Greenhouse evergreens (*ord.* Compositæ). Propagation, by cuttings of half-ripened wood in sand

Ortgiesia (*see Æchmea*).
Orthochilus (*see Eulophia*).
Orthopogon (*see Oplismenus*).
Orthostemma (*see Pentas*).
Orthostemon (*see Feijoa*).
Orrala (*see Lamium*).
Osage Apple (*see Maclura*).
Osbeckiastrum (*see Dissotis*).

beneath a bell-glass. Soil, loam and peat in equal parts, with plenty of sand.

Principal Species :—

Bellidiastrum, 1′, Je., wh.
camphorina, 1½′, My., wh.
dentata, 1½′, My., wh.

OSMUNDA.

Description.—Handsome and stately Ferns (*ord.* Filices), either hardy or needing greenhouse protection. The rich brown sporangia are borne in large clusters, often at the apex of the fertile fronds, producing at a short distance an effect not unlike that of some flowering plant, and which has gained for them the title of Flowering Ferns.

Cultural Points. — Propagation is by spores. Plenty of root room and a large supply of moisture at all seasons are essential for the production of fine specimens. The hardy species do best in semi-shade, regalis being a grand plant for stream and lake sides, or boggy places. Substantial loam, with some peat and sand, forms a suitable compost for pot plants. Regalis, when uprooted, divided, and replanted, takes two or three years to properly recover from such disturbance.

Principal Species and Varieties :—

bipinnata, fronds 1½′ to 2′ long, grh.
cinnamomea, 2′ to 4½′, grh., young plants and fronds have a brownish down that is very effective; angustatum is a dwarf form.
claytoniana, 3′, fronds 6″ to 12″ broad, cool grh. (*syn.* interrupta); a handsome species.
javanica, 2′ to 4′, warm grh. (*syns.* presliana and Vachellii); the fertile pinnæ are the central or lower ones.
regalis, 2′ to 8′ (*syn.* spectabilis). Found wild in Wales, Ireland, Devon, and Cornwall, the grandest native Fern. There are several vars. The Royal Fern.
— corymbifera, 2′, forked pinnæ, a good pot plant.
— cristata, 3′, with tips of pinnæ finely crested.
— gracilis.
— palustris, 3′, light grn., young lvs. red, fine for cool rock fernery (*see* figure).
— purpurascens, of darker colour and lower stature than the type.

Other Species :—

corymbifera (*see* regalis var.).
humilis, 1½′.
interrupta (*see* claytoniana).
palustris (*see* regalis var.).
presliana (*see* javanica).
Vachellii (*see* javanica).

OSSÆA (*syn.* SAGRÆA).

Stove evergreen shrubs (*ord.* Melastomaceæ). Propagation, by cuttings in sandy peat beneath a bell-glass over bottom heat. Soil, fibrous loam and sandy peat. The species are numerous, but they are not commonly grown.

OSTEOCARPUS.

Greenhouse sub-shrubs (*ord.* Convolvulaceæ). Propagation, by seeds and division. Soil, peat, loam, and sand.

Principal Species :—

rostratus, 2′, sum., bl. (*syn.* Alona rostrata).

OSTEOMELES.

Hardy and half-hardy evergreen trees and shrubs (*ord.* Rosaceæ). Propagation, by seeds, cuttings, and layers. Soil, deep, fertile loam.

Principal Species :—

anthyllidifolia, 3′, sum., grh., wh., anthers yel.
ferruginea, Jy.

Osmodium (*see Onosmodium*).

OSTEOSPERMUM.

Greenhouse evergreen South African shrubs or sub-shrubs (*ord.* Compositæ). Propagation, by cuttings beneath a bell-glass in spring. Soil, sandy loam and fibrous peat. The genus is seldom cultivated in this country.

Principal Species :—

corymbosum, 3′, Aug., yel.
ilicifolium, 4′, Jy., yel.
moniliferum, 3′, Jy., yel.

OSTROWSKIA.

A handsome hardy perennial (*ord.* Campanulaceæ), that responds to much the same treatment as Campanulas. It must, however, be grown in a spot sheltered from strong winds, but in no way shaded. A deep, but light and rich soil, suits it.

OSMUNDA REGALIS PALUSTRIS.

Carefully support each growth and give water during dry periods, as any special attention given is amply repaid by this fine species. The flowers are campanulate and very large, and though somewhat fugitive, this is atoned for by the number produced in succession. In cold districts it is best treated as a cool greenhouse plant.

Only Species :—

magnifica, 3½′ to 5′, 5″ to 6″ across, light bl., Jy., Aug.

OSTRYA. (HOP HORNBEAM.)

Hardy deciduous trees (*ord.* Cupuliferæ). Propagation is by seeds, layers, and cuttings, or grafts on the common Hornbeam. Soil, deep loam. A moderately moist situation is also desirable.

Principal Species :—

carpinifolia, 20′, My., grn., wh. (*syns.* italica, vulgaris, and Carpinus Ostrya).
quercifolia (this is correctly a cut-leaved form of Carpinus Betulus, named incisa).
virginica, 20′, Ap., My., grn., wh. (*syns.* virginiana, Carpinus triflora and C. virginiana).

OSYRIS.

Half-hardy evergreen shrubs (*ord.* Santalaceæ). Propagation, by cuttings of ripened wood under a bell-glass. Soil, fibrous loam and sand.

Principal Species :—

alba, 3′, My., wh., fruits red.

OTACANTHUS.

Stove herbs (*ord.* Acanthaceæ), closely allied to Ruellia. Propagation, by cuttings in sandy soil beneath a bell-glass over mild bottom heat. Soil, fibrous loam, leaf mould, peat, and sand.

Principal Species :—

cæruleus, 2′, aut., pur. bl. or vio. bl.

OTHERA.

A hardy shrub (*ord.* Ilicineæ). It thrives under the same culture as Ilex, to which it is referred by the Kew authorities.

Only Species :—

japonica, 3′, sum., wh. (correctly Ilex integra).

OTHONNA. (Ragwort.)

A genus of annual, herbaceous, tuberous-rooted, and evergreen greenhouse plants (*ord.* Compositæ) from South Africa. Propagation, by seeds for the annuals, division for the herbaceous and tuberous-rooted perennials, and cuttings for the shrubs. Soil, three parts fibrous loam and one part sandy peat. Ample drainage is essential, and, given this, cultivation is easy.

Principal Species :—

amplexifolia, 1½′, Je., yel., shrubby.
carnosa, 10″, sum., yel., sub-shrub.
cheirifolia (*see* Othonnopsis cheirifolia).
crassifolia, sum., yel., drooping, basket plant.
frutescens, 2½′, sum., yel.
tuberosa, 2′, Aug., yel., tuberous-rooted herb.

OTHONNOPSIS.

Described as greenhouse shrubs (*ord.* Compositæ), but cheirifolia is hardy in sheltered places, even in northern gardens.

Principal Species :—

cheirifolia, 1½′, My., yel. (*syn.* Othonna cheirifolia).

OTIORHYNCHUS.

The tiny beetles or weevils that constitute this genus are hardy little creatures, of either dull brown or dull black colour, ⅛″ to ½″ long, and with short tapering beaks. They are adepts at hiding in refuse and crevices, all are night feeders, and, fortunately for the gardener and farmer, they are wingless. White cloths or tarred boards laid or held under infested plants while the latter are shaken at night, or a bright light is flashed upon them, are methods of catching the weevils. Where the infestation is very bad, the removal of several inches of surface soil is advised, burning or gas-liming it, and replacing with clean, fresh material. The chief species are sulcatus, Vine Weevil; tenebricosus, Red-legged or Apricot Weevil; and picipes, Clay-coloured Weevil.

Ostrich Fern (*see Onoclea, syn. Struthiopteris*).
Oswego Tea (*see Monarda*).
Otaheite Apple (*see Spondias*).
Otaheite Chestnut (*Inocarpus edulis*).
Otaheite Orange (*see Citrus and Orange*).
Otandra (*see Geodorum*).
Othlis (*see Doliocarpus*).
Otidia (*see Pelargonium*).

OTOCHILUS.

Epiphytal Orchids (*ord.* Orchidaceæ) from Nepaul, that succeed in a stove or warm intermediate house, if grown in peat and sphagnum on a raft or in a Teak basket. As few roots are produced, watering must be carefully done.

Principal Species :—

fusca, 9″, Jy., br., yel., ro., fragrant.

OTOSTEGIA.

A half-hardy evergreen (*ord.* Labiatæ). Propagation, by cuttings under a hand-light. Any fertile garden soil.

Principal Species :—

scariosa, 9″, Aug., pur.

OTTELIA.

Stove or greenhouse aquatics (*ord.* Hydrocharideæ). Propagation, by seeds. Soil, loam in an immersed basket.

Principal Species :—

alismoides, 6″, sum., wh.
ovalifolia, 6″, sum., wh., yel.

OURISIA.

Hardy perennials (*ord.* Scrophularineæ). Propagation, by seeds and division. Any ordinary garden soil will suit, provided a warm position is given. They like partial shade and moisture.

Principal Species :—

cæspitosa, wh.
coccinea, 10″, sum., sc.
Pearcei, 8″, sum., sc., crim.

OUVIRANDRA. (Lattice- or Lace-leaf Plant.)

Stove aquatics (*ord.* Naiadaceæ) whose interest lies in the exquisite lattice- or lace-like leaves. Propagation, by seeds and division. Soil, sandy loam immersed in water having a regular temperature of 70°.

Other Cultural Points.—These beautiful plants are from Madagascar, and under cultivation they need a semi-dark position such as is found beneath the stage in a plant stove, but as in such a spot their beauty is not readily seen, it is a good plan to have a false bottom to the tank, consisting of a sheet of iron, enamelled white (the white and the green contrasting finely), with one or more circular holes large enough to easily admit the flower pots. Owner, gardener, or visitor can readily examine the plants by raising this false bottom by means of a chain attachment to the pot rims, and do so without disturbing the specimens. Derbyshire spar is sometimes used to cover the tank bottom, but, as this soon becomes green, it does not long serve as a contrasting background to the deep green of the Lattice-leaf.

Principal Species :—

bernieriana, 2′, Aug., pk.
fenestralis, 2′, Aug., wh. (correctly Aponogeton fenestrale).

OVARY.

The part of a flower that forms the base of the pistil and contains the ovules or unfertilised seeds, is the ovary; when the seeds are ripe the ovary becomes a fruit. There are two very distinct types of ovaries—one, the superior ovary, as found in Roses and Lilies, where it is within or above the

Otoptera (*see Vigna*).
Otostemma (*see Hoya*).
Our Lady's Milk Thistle (*see Silybum*).

petals; the other is the inferior ovary, as found in Orchids, Amaryllids, Composites, etc., where it is produced behind or below the showy sepals and petals. An ovary may be compound, and contain one or more cells or carpels, and the walls of these carpels are known as placentæ, and according to the disposition of the ovules in relation to these, their placentation is described as parietal, axile, or free central. The common garden Pea presents one of the simplest forms of ovary, and affords ample evidence in support of the scientific contention that the ovary, as well as other parts of a flower, is but a metamorphosed leaf.

OVULE.

An ovule is a small body within the ovary, that will, when fertilised by the contents of a pollen tube that has grown down through the pistil from the stigma, become a seed. The ovule is furnished with nucleus, embryonic vesicle, and material that will (generally) subsequently form a large part of the seed body, and provide food for the tiny seedling ere it can support itself. If this material (albumen) is within the embryo sac, it is known as the endosperm; if outside it, the perisperm. Each ovule is attached to the ovary by a tiny stalk (funicle), and is said to be orthotropous, anatropous, or campylotropous, according as it is straight, inverted, or curved.

OXALIS.

Description.—A genus of about 250 species (*ord.* Geraniaceæ), comprising hardy annuals, hardy and greenhouse herbaceous perennials, hardy and greenhouse tubers, and greenhouse and stove evergreens.

Propagation.—By seeds for the annuals, seeds and division for the herbaceous, offsets for the tuberous species, and cuttings for the evergreens.

Soil.—Sandy loam and peat or leaf soil for pot plants; fairly light garden soil for hardy forms.

Other Cultural Points.—Species that have tuberous rootstocks need a long, dry period of rest when growth is finished. Several, especially corniculata rubra, are admirable for use in summer bedding, either as edging or carpeting, but this must be kept in bounds, or it will become a weed. For conservatory decoration, cernua, the Bermuda Buttercup, is well suited when grown in pans or shallow pots and suspended from the roof, its deep green leaves and yellow flowers, borne in umbels on long scapes, hiding the pot and making an effective display.

Culture of Oxalises for Food.—The tubers of Deppei are occasionally used as a vegetable, being prepared and boiled in rich stock, and then served with melted butter. The tubers are started in pots early in March, and planted out 10″ asunder about the beginning of May. The soil should be light and deep, and some decomposed manure should be mixed with the second spit. The ground must be kept hoed to keep down weeds and prevent waste of food. Heavy waterings must be applied in dry weather. The tuberous roots of the tall-growing tuberosa are used as an article of food in South America, when cooked, under the name of Oca, this title also covering the smaller farinaceous bulbs of crenata.

Principal Species and Varieties:—

Acetosella, 3″, spr., wh.
articulata, 3″, sum., mauve.
Barrelieri, 1′, spr., st., yel.
bowieana (*see* purpurata).
carnosa, 6″, aut., grh., yel.
cernua, 6″, spr., grh., yel. (*syns.* caprina and concinna). There is a double var.
corniculata rubra, 6″, sum., hdy., yel., foliage pur.
Deppei, 4″, Mch., grh., red.
elegans, 6″, Jy., hdy., pur.
enneaphylla, 4″, Je., hdy., wh., ro.
floribunda, 1′, spr., grh., ro. (*syn.* lasiandra of R. Graham); alba and cœrulescens are respectively wh. and bluish vars.
hirta, 3″, sum., grh., bl. to red (*syn.* rubella); fulgida and rosacea are pur. and red vars.
lobata, 3″, Oct., hdy., yel.
Ortgiesii, 1′, sum., grh., yel.
pentaphylla, 6″, Apr., Sep., grh., lil., yel. (*syn.* digitata).
purpurata, 3″, Oct., grh., pur. (*syn.* bowieana).
rosea, 8″, spr., grh. (*syn.* racemosa).
tetraphylla, 6″, Je., grh., red (*syn.* esculenta).
valdiviana, 8″, sum., grh., yel. streaked red.
variabilis, 3″, Nov., grh., varying from the wh. alba (*syn.* grandiflora) to the red rubra (*syn.* speciosa), and the crim. Simsii.

Other Species:—

alba, 9″, My., hdy., wh.
arenaria, 4″, spr., grh., vio. pur.
bifurca, 1′, aut., grh., pk.
bipunctata (*see* corymbosa).
brasiliensis, 3″, Oct., grh., ro.
canescens (*see* tubiflora).
caprina (*see* cernua).
concinna (*see* cernua).
corymbosa, 6″, spr., grh., lil. (*syns.* bipunctata and urbica).
— martiana. grh., yel.
crenata, 2′, Sep., grh., yel.
Cummingii, 3″, Sep., grh., yel.
digitata (*see* pentaphylla).
esculenta (*see* tetraphylla).
fabæfolia, 4″, Oct., grh., red.
flava, 6″, Mch., grh., yel. (*syn.* pectinata).
grandiflora (*see* variabilis var.).
imbricata, 4″, aut., grh., ro. There is a double var.
incarnata, 6″, My., pk.
lasiandra of R. Graham (*see* floribunda).
lasiandra of Zuccarini, 9″ to 18″, sum., hdy., crim.
lasiopetala, 6″, Jy., grh., pk.
macrostylis (*see* tubiflora).
martiana (*see* corymbosa var.).
mauritiana, 3″, Sep., grh., ro.
pectinata (*see* flava).
Plumieri, 2′, sum., st., yel.
polyphylla, 6″, My., pur.
rubella (*see* hirta).
Simsii (*see* variabilis var.).
speciosa (*see* variabilis var.).
tenera, 3″, My., grh., yel.
tenuifolia, 6″, Oct., grh., wh., red.
tubiflora, 1′, Nov., grh., pk. (*syns.* canescens and macrostylis).
urbica (*see* corymbosa).
versicolor, 3″, Feb., grh., crim.
violacea, 3″, My., hdy., vio.

OXERA.

A genus (*ord.* Verbenaceæ) producing an abundance of handsome flowers. Propagation, by cuttings in sandy soil, beneath a bell-glass, over bottom heat. Soil, peat and loam, both fibrous, and sand.

Principal Species:—

pulchella, 10′, sum., st. ev., wh. or creamy wh.

OXYANTHUS.

Stove evergreen shrubs (*ord.* Rubiaceæ). Propagation, by cuttings in spring in sandy peat, beneath a bell-glass, over bottom heat. Soil, sandy loam and fibrous peat.

Principal Species:—

tubiflorus, 3′, Jy., wh. (*syns.* hirsutus and speciosus, and Gardenia tubiflora).
versicolor, 3′, Jy., wh.

Oxeye (*see Buphthalmum*).
Oxeye Daisy (*see Chrysanthemum Leucanthemum*)
Oxlip (*see Primula elatior*).
Oxyacantha (*see Cratægus*).

OXYBAPHUS. (Umbrella-wort.)

Hardy and half-hardy perennials (*ord.* Nyctagineæ). Propagation, by seeds sown out of doors in May. Soil, sandy loam. Protection should be afforded in winter. Practically all the species are purple flowered, but they are seldom seen in cultivation.

Principal Species :—

californicus, 2′, Jy., pur.
floribundus, 1′, Jy., pur.
nyctagineus, 1′, Aug., pur.
violaceus, 1′, Jy., vio. (*syn.* Allionia violacea).

OXYCOCCUS.

Hardy evergreens (*ord.* Vacciniaceæ), notable as producing the well-known Cranberries, which *see*. Propagation is easily effected by layering the creeping stems, or by cuttings. Peaty soil best suits them, and if it is always moist, so much the better, as they like swampy places.

Principal Species :—

macrocarpus, 9″, My., pk. (*syns.* Vaccinium macrocarpon and V. Oxycoccus var. oblongifolium). American Cranberry.
palustris, 6″, My., pk. (*syns.* vulgaris and Vaccinium Oxycoccus). Common Cranberry.

OXYDENDRON.

Hardy trees (*ord.* Ericaceæ). Propagation, by imported seeds. Soil, moist, fibrous peat.

Principal Species :—

arboreum, 20′ to 40′, sum., wh. (*syns.* Andromeda and Lyonia arborea).

OXYLOBIUM.

Greenhouse evergreen shrubs (*ord.* Leguminosæ). Propagation, by seeds (after soaking), and by cuttings, both in heat. Soil, light, fibrous peat, a little loam, and charcoal. Abundant drainage is essential.

Principal Species :—

Callistachys, 4′, Je., yel. (*syns.* Callistachys lanceolata, longifolia, ovata, and retusa).
ellipticum, 3′, Jy., yel.
— angustifolium, a fine, long-leaved form (*syn.* arborescens).
lineare, 2′, Oct., yel. or red (*syn.* Callistachys lineare).
Pultenæa, 2′, spr., or.
retusum, 2′, My., or. (*syn.* ovalifolium).
scandens, 3′, Ap., yel. (*syns.* Mirbelia Baxteri and Podolobium scandens).
trilobatum, 2′, Apr., yel. (*syns.* Podolobium trilobatum and Pultenæa ilicifolia).

Other Species :—

acutum, 2′, Mch., red, yel. (*syn.* Gastrolobium acutum).
arborescens (*see* ellipticum var.).
capitatum, 2′, Je., yel.
cuneatum obovatum, 2′, spr., yel., pur. (*syn.* obovatum).
ovalifolium (*see* retusum).
staurophyllum, 2′, Ap., yel. (*syn.* Podolobium staurophyllum).
virgatum, 1½′, My., or. sc. (*syn.* Gastrolobium retusum).

OXYPETALUM.

Stove evergreen twiners (*ord.* Asclepiadeæ). Propagation, by cuttings in sand, beneath a bell-glass, over bottom heat. Soil, fibrous peat and sandy loam.

Principal Species :—

Banksii, 6′, Je., pur.
cæruleum, 3′, Jy., bl. (*syns.* Tweedia cærulea and T. versicolor).
solanoides, 6′, Je., bl., ro., or pur. (*syns.* Tweedia floribunda, T. pubescens, and T. rosea).

Oxygonium (*see Asplenium*).
Oxyramphis (*see Lespedeza*).

OXYSPORA.

Stove evergreen shrubs (*ord.* Melastomaceæ). Propagation, by cuttings of young shoots in sandy peat, beneath a bell-glass, over bottom heat. Soil, fibrous loam, sandy peat, and charcoal.

Principal Species :—

paniculata, 3′ to 6′, Je., red (*syn.* vagans).

OXYSTELMA.

Stove evergreen twiners (*ord.* Asclepiadeæ). Propagation, by cuttings in spring, in sand, beneath a bell-glass, over bottom heat. Soil, sandy peat and fibrous loam.

Principal Species :—

esculentum, 4′, My., wh., spotted pur.

OXYTENANTHERA.

Stove plants (*ord.* Gramineæ) of graceful appearance, closely allied to the Bambusas, and, like them, requiring rich loam and plenty of moisture to grow in. Propagation is by division or stem cuttings. The best known species is abyssinica, which grows to a good height, its stems furnishing spear shafts and canoe poles in some parts of tropical Africa.

OXYTROPIS.

Hardy herbaceous perennials (*ord.* Leguminosæ). Propagation, by seeds, division, and cuttings. Soil, well-drained, sandy loam. Positions in a rock garden where the plants are exposed to full sunshine will suit these pretty little plants admirably.

Principal Species :—

cyanea, 6″, Je., Jy., pur. bl.
Lambertii, 1′, My., Aug., varying from wh. through bl. to pur.
montana, 6″, Je., Jy., pur., yel.
pilosa, 6″, Jy., yel.
pyrenaica, 6″, sum., pur., lil., or bl.
uralensis, 4″, My., Jy., pur. (*syn.* Halleri).

Other Species :—

campestris, 6″, Jy., yel., tinged pur.
fœtida, 6″, Jy., pur.
grandiflora, 6″, Jy., ro.
ochroleuca, 6″, sum., yel., wh.
sulphurea, 6″, Jy., cream, yel.

OYEDÆA.

Greenhouse evergreen shrubs (*ord.* Compositæ). Propagation, by cuttings. Soil, fibrous loam, peat, and sand.

Principal Species :—

bupthalmoides, 3′, Sep., yel.

OYSTER SHELL BARK LOUSE.

This (Mytilaspis Pomorum, also known as the Mussel Scale) is troublesome on the bark of Apple and Pear trees, particularly those in an unhealthy condition. The mature scale is dark brown in colour, paler at the end. The eggs are hatched in May, the insects spreading to the younger branches in search of food. For small trees and light attacks, the best remedy is scrubbing the branches in winter with a soap and paraffin mixture. The trees should also be syringed in February with the caustic potash wash. (*See* Insecticides.)

Oxyura (*see Layia calliglossa*).
Oyster Plant (*see Mertensia maritima*).
Oyster, Vegetable (*see Salsify*).
Ozophyllum (*see Ticorea*).
Ozothamnus (*see Helichrysum*).

PACHIRA (*syn.* CAROLINEA).

A genus of stove trees (*ord.* Malvaceæ) with petals 6″ to 12″ long, palmate leaves, and long, finger-like leaflets, not often seen in cultivation. Propagation, by cuttings of mature shoots in a propagating case. Soil, good fibrous loam, with a little sand.

Principal Species :—

alba, 20′, Jy., wh.
aquatica, 30′, red, yel., grn. (*syn.* Carolinea princeps).
insignis, 20′, red.
macrocarpa, 30′, red, yel., grn.
minor, 20′, Jy., red, yel., grn.

PACHYNEMA.

Half-hardy herbs or sub-shrubs (*ord.* Dilleniaceæ), with Rush-like or flattened, erect branches, and leaves reduced to scales. Propagation, by imported seeds; also by cuttings in gentle heat. Soil, fibrous loam and peat, with sand.

Principal Species :—

complanatum, yel.

PACHYPHYLLUM.

Epiphytal herbs (*ord.* Orchidaceæ), with short, ascending, densely leafy racemes. Propagation, by cuttings in sandy loam and crocks, or finely broken bricks. A similar soil will answer for established plants.

Principal Species :—

procumbens, My., grn., bl.

PACHYPODIUM.

Greenhouse evergreen shrubs (*ord.* Apocynaceæ), often with fleshy, thickened stems, and bearing rosy white flowers at the apex of the branches. Propagation, by cuttings, allowing the cut ends to become dry before insertion in sand; also by division of the fleshy rootstock. Soil, light loam, with plenty of sand and some finely broken bricks. Little water is required in winter.

Principal Species :—

Saundersii, 1′.
tomentosum, 1′, sum. (*syns.* succulentum and tuberosum).

PACHYRHIZUS.

Tall, twining stove herbs (*ord.* Leguminosæ), with the habit of the Scarlet Runner. Propagation, by seeds; also by tubers, and by cuttings of lateral shoots in sand, under a bell-glass, in heat. Soil, fibrous loam with a third of leaf mould, and plenty of sand.

Principal Species :—

angulatus, Jy., vio. pur.
thunbergianus (now Pueraria thunbergiana).
tuberosus, Jy., Aug.

PACHYSANDRA.

Hardy, perennial herbs (*ord.* Euphorbiaceæ), with yellowish flowers of no great beauty, procumbent stems, and ascending branches. Propagation, by division, or by suckers in spring as growth is commencing. Soil, ordinary garden.

Principal Species :—

coriacea (now Sarcococca pruniformis var.).
procumbens, 6″, Ap., br.
terminalis, lvs. with wh. edges.

Pachistima (*see Pachystima*).
Pachychilus (*see Pachystoma*).
Pachylophus (*see Œnothera*).
Pachyphytum (*see Cotyledon*).
Pachystigma (*of Hooker, see Peltostigma*).

PACHYSTIMA (*syns.* PACHISTIGMA of Meissner, and PACHISTIMA of Raffinesque).

Hardy shrubs (*ord.* Celastrineæ), with evergreen foliage and small axillary flowers. Propagation, by cuttings of half-mature shoots under a frame, in pots of sandy soil. Any friable, well-drained garden soil will suit them.

Only Species :—

Canbyi, 4″, greenish.
Myrsinites, 1′ to 2′, Je., wh. (*syn.* Myginda myrtifolia).

PACHYSTOMA.

Stove terrestrial Orchids (*ord.* Orchidaceæ), with erect, more or less leafless stems, and racemes of drooping flowers. Propagation, by division. Soil, fibrous loam, with a little peat and sand.

Principal Species :—

speciosum, 6″, Jan., yel. (now Ipsea speciosa).
thomsonianum, 6″ to 8″, wh., pur.

PACKING.

Most gardeners, whether amateur or professional, have occasion to pack fruits, flowers, vegetables, or plants, and it is necessary to be conversant with the methods by which these can be so packed that they may arrive in good condition after a journey, either by rail or post.

Fruits.—Grapes sent from one person to another for private consumption should be packed in boxes sufficiently strong to resist pressure from other packages, which may be stood upon them, and of a size little more than sufficient to hold the quantity. Cover the bottom of the box with cotton wool or wood wool, the latter being preferable on account of its elasticity. It consists of the fine shavings of wood, the best being made from Willow or Poplar, as it is not liable to taint the fruit like resinous Pine wood wool. Dry moss has also been used. Over the padding place a couple of sheets or folds of tissue paper, with the ends hanging over the sides, so as to cover the Grapes when the box is full. Put in as many bunches as will fill the box, keeping the stalks uppermost. Put the paper over, and if there are any hollows place some packing material into the same, so as to prevent shifting on the journey, the great object being to preserve the "bloom." If possible, the points of the bunches should be tied down. Choice Peaches and Nectarines should be packed in shallow boxes to hold one layer, over wood wool and with tissue paper for packing. Each fruit should have a strip of paper wound round it, so as to keep it from rubbing its neighbour. The tops of the fruits should be exposed to view when the lid of the box and the covering of tissue paper have been removed. Figs may be packed in Vine leaves, and one layer deep, in shallow boxes. Strawberries may be packed in their own leaves, slightly withered, one layer deep in shallow boxes. The above soft fruits should be gathered before they are dead ripe. Apricots, Plums, and Cherries travel well if packed closely in shallow boxes.

Flowers.—Most flowers intended for travelling by post or rail should be cut in the morning, before the sun has made them limp, and placed in water for a few hours before packing. Deal or tin boxes of no great depth are best for maintaining the freshness of the flowers. Pack the flowers closely in layers without crushing. All flowers should be cut in the younger stages, even if not fully developed, as they last longer after completing their journey. Irises should be cut and packed just before the buds

A GROUP OF KELWAY'S TREE PÆONIES

THE WHITE VARIETY IS CHRISTINE ; THE RED ONE, GENERAL HECTOR MACDONALD.

expand ; it is a mistake to send them away in full bloom. The box should be lined with tissue paper, and no cotton wool should be permitted to come in contact with flowers, as it abstracts the moisture from them, and it is impossible to again separate the wool from the flowers.

Vegetables.—Cabbages, Cauliflowers, and similar subjects should merely have the superfluous leaves trimmed off. All roots should be thoroughly

Photo : Cassell & Company, Ltd.

Tree Pæony Lord Roberts (*see p.* 154).

washed, and have the tops reduced for economy of space. All should then be firmly and neatly packed in wicker baskets or hampers, and the lid tied down.

PÆDERIA.

Stove shrubs (*ord.* Rubiaceæ), with axillary or terminal bunches of small flowers, succeeded by berries having a membranous, transparent skin. Propagation, by cuttings in sand, in a propagating case. Soil, fibrous loam, with a fourth part of leaf mould and sand.

Principal Species :—

fœtida, 6′, pur. Chinese Fever Plant.

PÆDEROTA.

Dwarf, many stemmed, hardy herbs (*ord.* Scrophularineæ), with blue or yellow flowers in dense terminal spikes. Propagation, by seeds in a cold frame. Soil, sandy loam.

Principal Species :—

Ageria, 6″, My., yel. Bonarota, 6″, My., bl. Chamædrifolia is a var.

PÆONIA. (PÆONY.)

Description.—The Pæonia (*ord.* Ranunculaceæ) is one of the most brilliant of garden flowers, and is admirably suited for the decoration of borders and shrubberies, as well as for beds in the grass or in the more formal garden. The improvements which have been in progress among the herbaceous Pæonias, principally derived from albiflora, have given flowers of great beauty, quite distinct from those of officinalis, the old Pæony of gardens. Pæonias are often very beautiful in foliage, especially in early spring. The shrubby Pæonias, varieties of Moutan, are gorgeous flowers.

Propagation.—The herbaceous Pæonias by division, performed after flowering ; the species also by seeds, sown as soon as ripe in pans or boxes under glass. Seedlings make slow progress. Tree Pæonias are increased by grafting scions without flower buds on stocks of officinalis or albiflora in August, planting the roots in pots, and placing them in a frame with the point of union just below the soil. Division and layering are sometimes practised.

Soil.—A good, rich, well-manured loam will suit almost all the Pæonias. It ought to be trenched or bastard trenched before planting, and plenty of well-rotted cow or other animal manure added. It is a mistake to use much rank, fresh manure.

Other Cultural Points.—The herbaceous Pæonias are quite hardy, but the Tree varieties will require a little protection from late frosts in spring. They should all have plenty of water at that season, and in summer, and ought to be disturbed as little as possible. Tree or Moutan Pæonias may be grown in pots and forced gently for early bloom from February onwards. Shade from the morning sun is desirable for all the Pæonias.

Photo : Cassell & Company, Ltd.

Tree Pæony Lady Sarah Wilson (*see p.* 154).

Principal Species and Varieties :—

albiflora, 2′ to 3′, My., Je., wh., pk. Many garden vars. : for a selection, *see* p. 154.
— fragrans.
— Humei.
— reevesiana.
corallina, 3′, My., crim.
— Russii, 3′, My., crim.
humilis, 2′, My., red.

Padus (*see Prunus*).

lutea, 3′, My., shr., yel.; very scarce.
Moutan, 3′, My., various. Tree Pæonia. (*See* below for selection.)
officinalis, 3′, My., crim. Many vars., such as albicans, anemonæflora (double, red, ro.), lobata, Sabinii, double red, double wh., double blush.
tenuifolia, 2′, Je., crim., prized for its leaves. Forms flore-pleno, latifolia hybrida, and rosea are good.
wittmanniana, 2′, My., pale yel.

Other Species and Varieties :—

anomala, 3′, My., crim. (*syns.* Fischeri and intermedia).
arietina, 3′, My., red (*syn.* cretica).
— alba, wh.
— Andersoni, ro.
— Baxteri, crim.
— Northern Glory, ro. pk.
Broteri, 2′, My., crim., ro., or wh.
Brownii, 1′, My., red, wh.
coriacea, 2′, My., ro.
decora, 3′, My., crim.
— elatior, flowers larger.
— Pallassii, crim.
Emodi, 3′, Ap., wh., half-shade.
microcarpa, 2′, My., crim.
— Jonathan Gibson, pk.
mollis, 1′, My., red.
paradoxa, 1½′ My., red.
— fimbriata, pur.
peregrina, 3′, My., crim.
— compacta, dwarf.
pubens, 2′, My., ro. (referred by *Index Kewensis* to officinalis).
triternata, 3′, My., crim.
villosa, 2′, My., wh.

Selection of Varieties of albiflora :—

Double :—

Agnes Barr, pk., yel.
Agnes Mary Kelway, ro., yel.
alba plenissima, wh.
Alexandre Dumas, ro., cream.
Cavallieria Rusticana, pur., crim.
Festiva maxima, wh., red.
François Ortigat, pur., crim.
La Tulipe, wh., crim.
Madame Breon, ro., pk., wh.
Masterpiece, cerise.
Mikado, ro.
Modeste Guerin, cherry ro.
Mrs. Stubbs, flesh wh.
Novelty, cream, pk.
Prince George, pur.
Prince Prosper, pur., car.
Princess May, cream.
Rose d'Amour, flesh.
Sir Henry Irving, ro. pk
Summer Day, cream.
Whitlejii, blush, wh.

Single :—

Amiable, cherry ro.
Blucher, car.
Bridesmaid, wh.
Duchess of Portland, pk., wh.
Empire, pur.
Hecate, pur., ro.
Lady Helen Vincent, wh., flesh.
Margaret Attwood, wh.
Rosy Dawn, wh., blush.
The Bride, wh.
Water Lily, wh.

Varieties of other Species than albiflora (Principally Single) :—

Blushing Maid, blush pk.
Ceres, cerise.
Crown Prince, crim.
Daniel Dewar, ro.
Exquisite, pk.
Gertrude Jekyll, crim.
insignis, crim. (*syn.* anomala insignis).
— Peter Barr, crim.
Otto Frœbel, salmon red.
Pompadour, crim.
Ruby Queen, red.
The Sultan, maroon.

Tree or Moutan Pæonias :—

Beauty, ro., lil.
Captain Lambton, wh., semi-double (*see p.* 155).
Don Quixote, ro., lil., vio.
Elizabeth, puce.
General Baden-Powell, red, semi-double (*see figure*).
Grand Duke, flesh, ro.
Henry Irving, maroon, crim.
James Kelway, rosy car. (*see p.* 155).
Jean de Reszké, wh.
Lady Sarah Wilson, blush, ro. blotches at base (*see p.* 153).
Lord Roberts, wh., tinged flesh (*see p.* 153).
Snowflake, wh.

PAGODA TREE.

This name has been given to various trees, including Ficus indica (*ord.* Urticaceæ). The appellation has more often been given to Plumeria acutifolia (*syn.* acuminata) and P. alba (*ord.* Apocynaceæ), but this usage must be of comparatively recent origin, as the trees are not indigenous to Asia. Sophora japonica (*ord.* Leguminosæ) has also been called the Pagoda Tree.

PALAFOXIA.

Hardy or greenhouse perennial herbs (*ord.* Compositæ), with white flowers similar to those of Eupatorium. Propagation, by seeds; also by division of the rootstock; and cuttings of the stems early in the season. For the hardy species, which properly belong to Polypteris, any good garden soil will suit. For linearis, use fibrous loam with a little leaf mould and sand.

Principal Species :—

fastigiata (now Polypteris integrifolia).
hookeriana (now Polypteris).
linearis, 2″, Je., grh., wh.

Photo: Cassell & Company, Ltd.

Tree Pæony General Baden-Powell.

PALAUA (*syn.* PALAVA).

A genus of annuals (*ord.* Malvaceæ) with rose or purple flowers arising singly in the axils of the leaves. Propagation, by seeds in a heated pit, frame, or hotbed. After germination they may be treated like Stocks and Asters, and finally planted out in May. Any friable, well drained garden soil will suit.

Principal Species :—

dissecta, 9″, Je., mauve (*syn.* Palava flexuosa).
malvæfolia, 9″, pk.
rhombifolia, sum., ro., stems prostrate.

PALICOUREA.

Stove shrubs (*ord.* Rubiaceæ), with evergreen foliage and berried fruits, allied to Psychotria and

Pagle (*see Primula officinalis*)

Painted Cup (*see Castilleja*).
Painted Grass (*see Arundo*).
Pala Indigo Plant (*Wrightia tinctoria*).
Palay or Ivory Tree (*see Wrightia*).

Rudgea. Propagation, by cuttings in pots of sand in a propagating case. Soil, fibrous loam, with a third of peat and leaf mould, and sufficient sand to make it porous.

Principal Species :—

crocea (*see* subcrocea).
gardenioides, 2′, sum., wh. (*syn.* Rhodostoma).
jugosa, lvs. satiny grn. above, pur. below.
nicotianæfolia, Sep., yel., berries vio. (*syn.* discolor, correctly Psychotria tabacifolia).
Pavetta, 2′, Aug., wh.
subcrocea, 4′, Jy., or. (*syn.* crocea).
violacea, 4′, Je., wh.

Photo: Cassell & Company, Ltd.

Tree Pæony Captain Lambton (*see p.* 154).

PALISOTA.

Evergreen perennial herbs (*ord.* Commelinaceæ), requiring stove heat. Leaves large, tufted. Flowers in dense heads, followed by blue or scarlet berries. Propagation, by cuttings; also by division, suckers, and seeds when obtainable. Soil, fibrous loam and a fourth part of rotted dung or leaf mould, with plenty of sand. They may also be planted out in the stove.

Principal Species :—

Barteri, 1′, pur.
bicolor, 12″ to 14″, lvs. grn., with paler centre, br. beneath.
bracteosa, 1′, wh.
Maclaudii, 2″, wh., hairs on the leafstalks blk.

PALIURUS.

Hardy deciduous shrubs (*ord.* Rhamneæ), with spiny stipules, slender branches, and clusters of small yellow flowers. The most frequently cultivated species is australis, which is often trained against a wall, but succeeds as a bush in the open ground. It grows abundantly in Judea, and for that reason, as well as its spiny character, it is popularly believed to be the plant from which the crown of thorns was made at the crucifixion of Christ, hence the name Christ's Thorn. Propagation, by seeds when obtainable; also by cuttings under a hand-light in summer, and by suckers and layers. Any good garden soil will suit them.

Principal Species :—

australis, 4′ to 6′, Je., grn., yel. (*syn.* aculeatus). Christ's Thorn, Garland Thorn.
ramosissimus, 6′, Aug., grn., yel. (*syn.* Aubletia).

PALLENIS (*syn.* Buphthalmum).

Hardy annuals (*ord.* Compositæ), having the innermost bracts of the flower heads chaffy and the outer ones spiny. Propagation, by seeds in spring. Any good garden soil will suit. Spinosa, 2½′, July, yellow, with yellow rays (*syn.* Buphthalmum spinosma), is the best known species, and it is not widely cultivated.

PALM.

Description.—Mostly stove trees (*ord.* Palmæ) of greater or less stature, with evergreen foliage. The leaves are of two leading types according as they are built up on the pinnate (feather nerved) or palmate (fan shaped) plan. Well-known examples of the former are Howea (*syn.* Kentia) belmoreana, and H. forsteriana, and Cocos weddelliana. The apical pinna is generally, if not always, undeveloped in Geonoma and Chamædorea, so that when the leaf is little divided it may be merely bifid. In Phœnix the pinnæ appear in four rows. The feather veined type becomes more disguised in Wallichia and

Photo : Cassell & Company, Ltd.

Tree Pæony Jas. Kelway (*see p.* 154).

Arenga, the segments of which resemble the tail of a fish. In Caryota the huge leaf is bipinnatisect with fish-tail segments. The palmate or fan shaped leaf is well illustrated by Sabal, Chamærops, Livistona (*syn.* Latania), Thrinax, and Trachycarpus, all familiar garden Palms.

Pallasia (*of L'Heritier, see Encelia*).

Propagation.—A few Palms like Rhapis flabelliformis and R. humilis, which branch at the base, may be propagated by taking off more or less rooted suckers and establishing them in pots. The majority are propagated by seeds, the more common of which are imported in boxes containing several hundreds. These may be sown thickly in pans or boxes in good fibrous loam with a third of sharp silver sand. Give good drainage, as many of the seeds take a long time to germinate. In Palm growing establishments the boxes are often stood under the benches in warm pits till the seeds commence to germinate. The process will be hastened by standing the boxes at this stage upon a hotbed or bench with bottom heat. Pans containing choice seeds may be plunged in a hotbed at once. Seeds may be sown at any season, as soon as received, but early spring is the best time. Cover them with their own depth of soil, and never allow them to become dry, though saturation must always be avoided.

Soil.—Good fibrous yellow loam, with plenty of sharp silver sand, and a few nodules of charcoal to ensure porosity, makes the best and most durable compost for Palms. Some use a little peat as well; while others recommend loam, peat, leaf mould, and sand, but everything liable to decay quickly should be avoided. A little peat may be used in the early stages of the more delicate and slow-growing species. After the plants become of a useful size, anything that would promote rapid growth is undesirable, as slowly grown plants are the most useful and durable.

Potting.—When the seedlings have developed two or three leaves, pot them off singly in pots sufficient to contain the roots, those most suitable for Palms being narrow and deep. Place them on benches near the glass as thickly as they will stand. At all subsequent pottings use pots only slightly larger than those they were in, the object being to promote a slow, sturdy, healthy growth. Over-potting is detrimental to their welfare, especially when the roots are few. Avoid injury to the roots, and pot firmly. The ball of soil must be evenly moist before operations are commenced. In the case of large plants in tubs, many of the free-growing Palms will permit of the ball being pared down a little. This must not be attempted with small plants in pots. In large stoves, warm conservatories, and Palm houses, large trees may be planted out in prepared, well-drained borders, 3′ deep.

Other Cultural Points.—Most Palms require a moist, warm house or stove, with a range of temperature of 50° to 60° in winter, and 60° to 80° in summer. Some of the hardier kinds may be used in the conservatory in summer, and even in the sub-tropical garden. The leaves should be full-grown, and hardened by ventilation, before plants are taken into dwelling rooms. Trachycarpus excelsa is hardy in the south and west of England. Palms in pots should receive abundance of water in summer, and must not get dry in winter. When pot-bound, use liquid manure and soot water, which will give the foliage a rich, dark green colour, this feeding being preferable to repotting at unfavourable seasons, or too frequently at any time. Mealy bug and scale are amongst the more troublesome insects. Frequent syringing will serve to keep the plants clean. Sponging may become necessary at times, but syringing with kerosene or petroleum emulsion is less troublesome, very effective, and takes far less time.

Palms for Subtropical Bedding.—In places where tall trees cast a light shade in summer, so as to avoid the undue browning of the leaves, Palms may be grown by themselves or in association with other tropical plants, including Tree and other Ferns, with bold and handsome as well as graceful foliage. All must be removed indoors on the approach of inclement weather. Shelter against rough winds is also a primary requisite. Small specimens of Cocos weddelliana may be used as dot plants in fully exposed carpet-bedding designs. Some of the principal species of Palms for bedding out are Chamærops humilis and varieties, Chrysalidocarpus (*syn.* Areca), lutescens, Cocos weddelliana, Geonoma gracilis, Howea (*syn.* Kentia) belmoreana, H. forsteriana, Jubæa spectabilis, Livistona australis, L. chinensis (*syn.* Latania borbonica), L. rotundifolia, Phœnix canariensis, P. reclinata, P. rupicola, Rhapis flabelliformis, Rhopalostyle Baueri, R. sapida, and Trachycarpus excelsa (hardy in the south). Many others might be tried when they are easily obtainable.

Palms for Dwelling Rooms.—Many of the hardier species of Palms are used from time to time in house decoration, in dwelling rooms, reception rooms, halls, and lobbies; but those which may be described as relatively durable are not particularly numerous. Their durability also depends largely upon their having been grown slowly in moderately warm houses, rather than otherwise, before introduction to dwelling houses. The following are some of those most commonly met with: Chrysalidocarpus (*syn.* Areca), lutescens, Cocos weddelliana, Howea (*syn.* Kentia) belmoreana, H. forsteriana, Livistona australis, L. chinensis (*syn.* Latania borbonica), Phœnix canariensis, and Trachycarpus excelsa. Many other equally fine species are used for shorter periods, especially in gentlemen's establishments.

PALMITE.

An evergreen, perennial herb (*ord.* Juncaceæ), like a gigantic Wood-rush, the broad, deeply channelled leaves being finely but sharply serrated on the edges. Propagation, by seeds, and by division. Soil, fibrous loam and peat or leaf mould, with plenty of sand, plunging the pots for a few inches in the tank of a stove. The only species is Prionium Palmita, 6′, brown, the old leaf bases of which furnish a strong fibre used for brush-making.

PAMPAS GRASS.

One of the most beautiful plants for lawn specimens or for clumps near water is the giant Pampas Grass, commonly known as Gynerium argenteum, but recently referred by the Kew authorities to Cortaderia argentea. Some care in

Palma Christi (*see Ricinus communis*).
Palm, Cabbage (*see Oreodoxa oleracea*).
Palm, Date (*see Phœnix*).
Palmetto, Cabbage (*see Sabal*).
Palmetto, Dwarf (*see Sabal*).
Palmetto Fan (*see Sabal*).
Palmetto Palm (*see Sabal*).
Palmetto Saw (*Serenoa serrulata*).
Palm Oil (*see Elæis*).
Palm, Patana (*see Œnocarpus*).
Palm, Thatch (*see Sabal*).
Palmyra Tree (*see Borassus*).
Palsy-Wort (*see Primula officinalis*).
Palumbina (*see Oncidium*).

the selection of sites is necessary to success, for while robust growth and fine plumes can only be produced on light soils by the aid of liquid manure and a good water supply, yet, on the other hand, the Pampas Grass will not succeed in clayey land or in a cold, exposed situation. In the north and midlands shelter from north and east winds is almost essential, together with a deep, rich soil. Where necessary, some protection during winter should be afforded, and should rather take the form of a thatch to throw off snow and rain, than a heaping-up of material to keep the clump warm. In the southern counties such protection is seldom needed, and many fine examples are grown on southern slopes, halfway down toward

Pancratium fragrans (*correctly* Hymenocallis ovata).

the lake or stream margin. Too often the Pampas Grass is starved; if liquid manure, or dressings with rotten manure in spring or autumn, were more frequently applied there would be fewer failures.

Both from South America and the Cape quantities of Pampas Grass plumes are imported for home decoration, and these are sold either in the natural silvery state or dyed in various bright art shades. To secure the home grown plumes for room adornment it is necessary to cut the spikes in autumn, before cold rains or early frosts damage or discolour them.

PANAX.

Description.—A genus (*ord.* Araliaceæ) comprising hardy, greenhouse, and stove shrubs and trees, many with very ornamental leafage, and suitable, when small, for table plants.

Propagation.—By stem or root cuttings, or suckers, placed under a hand-light or in heat, according to the species.

Soil.—Fibrous loam and peat, with sand, suits the pot-grown and indoor species, and well-drained soil the hardy sorts.

Principal Species and Varieties :—

fruticosum, 6′, st., lvs. pinnate, grn.
— dissectum, 6′, lvs. bipinnate, grn., drooping.
— Guilfoylei, 6′, lvs. pinnate, grn., cream.
— Victoriæ, 6′, lvs. bipinnate, grn., wh., drooping.
— laciniatum, 6′, st., lvs. bipinnate, br., grn.

Other Species :—

crassifolium (now Pseudopanax crassifolium).
horridum (now Fatsia horrida).
longissimum, 10′, grh., lvs. long, grn.
Murrayi, 30′, st., brn., grn.
ricinifolium, 40′ to 60′, hdy., grn., wh. (*syn.* Aralia Maximowiczii) (now Acanthopanax ricinifolium).
spinosum, 10′, hdy., grn. (*syn.* Aralia pentaphylla, now Acanthopanax spinosum).

PANCRATIUM.

Description.—Handsome bulbous plants (*ord.* Amaryllideæ) nearly all requiring stove treatment. The hardy species are the better for protection in winter; heaped coal ashes or leaves covered lightly with soil answer admirably.

Propagation.—Principally by offsets potted in a light compost of loam, leaf mould, and sand.

Soil.—Sandy fibrous loam, leaf mould, fibrous peat, and decomposed dried cow manure. Though abundant supplies of water are required the provision for drainage must be perfect.

Principal Species :—

canariense, 1½′, aut., st., wh.
fragrans (now Hymenocallis ovata, *see* figure).
illyricum, 1¼′, sum., hdy., wh. (*syn.* stellare).
maritimum, 1½′, Je., hdy., wh. (*syn.* carolinianum).
zeylanicum, 1¼′, sum., st., wh. (*syn.* tiaræflorum).

Other Species :—

Amancæs (*see* Hymenocallis Amancæs).
amboinense (*see* Eurycles sylvestris).
angustum (now Hymenocallis caribæa).
australasicum (*see* Eurycles sylvestris).
calathinum (*see* Hymenocallis calathina).
caribæum (*see* Hymenocallis caribæa).
expansum (*see* Hymenocallis expansa).
guianense (*see* Hymenocallis tubiflora).
parviflorum (*see* Vagaria parviflora).
Sickenbergeri, 1¼′, sum., wh.
speciosum (*see* Hymenocallis speciosa).
stellare (*see* illyricum).
tiaræflorum (*see* zeylanicum).
tubiflorum (*see* Hymenocallis tubiflora).
undulatum (*see* Hymenocallis undulata).
verecundum, 1¼′, sum., wh.
viridiflorum (*see* Stenomesson viridiflorum).

PANDANUS. (Screw Pine.)

Description.—Stove evergreens (*ord.* Pandaneæ), that are valued for the beauty of their pointed, strap-shaped leaves; in some species these are handsomely variegated, and during the younger stages are invaluable for indoor decoration.

Propagation.—By suckers, removed and potted in small pots, and plunged in bottom heat in a close, moist stove.

Panætia (*see Podolepis*).
Panciatica (*see Cadia*).
Pandanophyllum (*see Mapania*).

Soil.—Rich, fibrous loam, with plenty of sand; a little peat assists the colouring of some of the variegated forms.

Other Cultural Points.—Give plenty of light, only shading from bright summer sunshine, and keep the plants elevated near the glass. Ensure cleanliness by syringing and fumigation, as the spiny leaves of most Pandanuses render sponging an unpleasant process.

Principal Species :—

Baptistii, 6′, habit like Veitchii, but with yel. markings, few spines (*syn.* dyerianus).
Candelabrum, 25′, lvs. broad, grn., spines wide apart.
glaucescens, dwarf, lvs. glaucous, spines wh.
javanicus variegatus, 3′, lvs. broad, grn., striped wh.
odoratissimus, 20′, lvs. 3′ to 5′, grn., spines wh. (*syn.* Blancoi).
pacificus, lvs. broad, shining grn., spiny.
Sanderi, 10′, lvs. 1′ to 3′, grn., striped yel., grn., wh., spineless.
utilis, 50′, lvs. 1′ to 2½′, grn., spines red (*syn.* elegantissimus).
Veitchii, 10′, lvs. 1′ to 3′, grn., banded wh., spineless (*see p.* 159).

Propagation.—By division, cuttings, or seeds, using a stove temperature in which to increase the warmth-loving species.

Soil.—A substantial compost of loam, leaf soil, and sand, giving more leaf soil to the smaller growers.

Principal Species :—

bulbosum, 5′, hdy.
capillare, 2′, sum., hdy. ann., grn.
miliaceum, 2, sum., hdy. ann., grn.
plicatum, 2½′, sum., st. or grh., grn.
— niveo-vittatum, a pretty st. plant now rarely seen.
variegatum. This popular trailing plant is correctly Oplismenus Burmannii variegatus (*see p.* 160).
virgatum, 3½′, sum., hdy. per., silvery grn.

Other Species :—

colonum, 1½′, aut., hdy. ann., grn.
Crus-galli, 2½′, sum., grn. (*syn.* Echinochloa Crus-galli).
italicum (now Setaria italica).
maximum, 6′, sum., st. per., grn.
spectabile, 3′, sum., st. per., grn.

PANDANUS GRAMINIFOLIUS.

Other Species :—

amaryllidifolius (*see* lævis).
caricosus, dwarf, lvs. narrow, glaucous, spiny.
discolor, lvs. bronzy grn.
dyerianus (*see* Baptistii).
furcatus, 10′, lvs. grn., spines br.
graminifolius, dwarf, lvs. narrow, greyish grn. (*see* figure).
Houlletii, 10′, lvs. 3′ to 5′, broad, grn., red, copper.
kurzeanus (*see* polycephalus).
lævis, lvs. long, grn., spiny.
Pancheri, 10′, lvs. 3′ to 5′, grn., red.
polycephalus, 6′, lvs. narrow, glaucous (*syn.* kurzeanus).
pygmæus, 2′, lvs. 1′, grn., wh. margins.
reflexus, 10′, lvs. 3′ to 6′, pendulous, grn., spines wh.
Vandermeeschii, 20′, lvs. 2′ to 3½′, glaucous, red midrib, margin, and spines.

PANICUM.

Description.—A variable genus of hardy, greenhouse, or stove Grasses (*ord.* Gramineæ), of either annual or perennial duration. Several are useful as pot plants for conservatory or other decorations, and all are easily grown.

PANNING.

A term usually applied to the provision of a soil basin round the base of plants and trees to ensure the water supplied passing directly to the roots.

The term has also another and totally different meaning, chiefly used in Orchid culture. It refers to the use of pans, instead of pots or Teak baskets, for the reception of shallow-rooting and spreading plants, just in the same way that "potting" refers to the use of pots, and "basketing" to the use of baskets.

Soil is sometimes spoken of as "panned" when it has settled down very close.

PANSY. (VIOLA TRICOLOR.)

Description.—The Pansy (*ord.* Violarieæ), since its introduction as a florists' flower early in the nineteenth century, through the work of Mr. Thompson, of Iver, Bucks, has been a favourite

Pandorea (*see Tecoma*).
Panisea (*see Cœlogyne*).

with all. The improvement in the plants known in gardens as Violas or Tufted Pansies, has caused the plants to largely supersede the Pansy for show and bedding purposes. Yet vigorous seedling Pansies are capital bedding plants, especially if treated as biennials. It is generally admitted that the florist's Pansy is derived from the native Viola tricolor, though some consider it is of hybrid origin. Exhibition Pansies are divided into two sections, the Show and the Fancy. The fine blooms given by the latter have greatly reduced the popularity of the Show flowers, which are summer. Pansies from seed may either be raised by sowing in heat in February, pricking off into a cold frame in April and planting out in May to bloom in summer or autumn; or by sowing in a cold frame or in the open ground in July to flower the following spring.

Soil. — Fresh, loamy soil, deeply dug and manured, preferably with cow manure, will grow the Pansy well.

Other Cultural Points. — For show purposes Pansies require a great deal of attention. When the plants are in frames aphides must be watched

Pandanus Veitchii (*see p.* 158).

divided into Selfs and White- and Yellow-grounds. Selfs have the flowers black, maroon, primrose, white, or yellow. White- or Yellow-grounds have a dark central blotch round the eye, and a band or margin of maroon, purple, or bronze. Fancy Pansies are distinguished by a wonderfully beautiful variety of colour, and are blotched, margined, or flamed. A number of fine strains of bedding Pansies are in cultivation, and separate colours can often be raised from selected strains. Trimardeau, Peacock, and Odier's Five-Spotted are good Pansies where showy flowers are wanted.

Propagation.—Cuttings of side growths, free from hollow stems if possible, are taken off below a joint and put into frames of light soil in August or September, where they have plenty of air after being rooted and where they remain until March, or they may be planted in their flowering beds in for; and a solution of soft soap, composed of 1½ oz. of soap to each gallon of water, may be applied while the plants are not in bloom once a fortnight or so with a syringe. In dry weather the plants must be well watered, the foliage as well as the roots receiving the fluid. An occasional dusting of the soil with guano, soot, or other fertiliser is beneficial if watered into the soil. The plants also need to be shaded from scorching sun with tiffany, and choice blooms need covering with bent tin or pasteboard to throw off rain and sunshine. Pansies ought to be thinned, if fine blooms are desired, by leaving only three or four branches on a plant, with one bloom on each. Bedding Pansies can be grown with less trouble, but the beautiful exhibition varieties are worthy of special care. The latter are usually exhibited now on tin stands or trays.

Selections of Varieties :—

Show Pansies :—

Agnes Kay, wh. ground.
Busby Beauty, yel. ground.
Busby White, wh. Self.
Dr. Campbell, yel. ground.
Dr. Inch, blk. Self.
John Brand, yel. ground.
Leslie Melville, blk. Self.
Leviathan, wh. ground.
Provost Colville, yel. Self.
Royal Visit, wh. ground.
Sir Wm. Arrol, dark Self.
Wm. Fulton, blk. Self.

Fancy Pansies :—

Col. M. R. G. Buchanan, br. blotches.
Constance Steel, wh., ro.
David Russell, yel., blk. blotches.
George Stewart, yel., chrome.
Kathleen Stirling, plum, bronzy yel.
Lord Roberts, prune, car.
Miss Neil, wh., crim.
Mr. B. Welbourne, brownish blk., drab.
Mrs. R. G. Moir, blk., wh.
Neil Mackay, blk., yel.
Susan Stuart, blk., yel., heliotrope.
Tamworth Yellow, yel.
Victoria, dark, wh.

Soil.—Any common soil will suit almost all the Papavers.

Other Cultural Points.—Most of the perennial Papavers transplant well, but the annuals are not so amenable to transplanting, and this should not be attempted save when the plants are small and during showery weather.

Principal Species and Varieties :—

nudicaule, 1′, sum., yel., or., wh.; a valuable plant, per. in a few gardens, but best grown as an ann. or bien.
glaucum, 1′, My., ann., sc.
orientale, 2′ to 3′, Je., per., or. sc., very showy; there are now many vars., varying in colour from wh. to sc. P. bracteatum is only a fine form of orientale. For names of varieties consult nurserymen's catalogues.
Rhœas, 1′, sum., ann., sc. Corn Poppy. Shirley Poppies are pleasing. Many single and double forms.
— umbrosum, 1′, sum., sc. Said to be a form of Rhœas, but distinct for garden purposes; best grown as a bien.
somniferum, 3′, Jy., ann., various. Many fine vars. Pæony flowered, large double flowers. Opium Poppy.

Panicum variegatum, *correctly* Oplismenus Burmannii (*see p.* 158).

PAPAVER. (Poppy.)

Description. — Well-known hardy annual or perennial plants (*ord.* Papaveraceæ), one or two of which yield the opium of commerce, but are employed in this country for garden decoration. The strain of Poppies known as the Shirley Poppies, derived from the Corn Poppy, P. Rhœas, gives some of the best annuals for garden use. Poppies for cut flowers should always be gathered before the buds open.

Propagation.—The annuals by seeds sown in the open where they are to bloom, well thinned out when fit to handle, and afterwards further thinned so as to give room to individual plants; the perennials also by seeds and by division. Some, such as the Oriental Poppy, P. orientale, are propagated by root cuttings also.

Other Species, Hybrids, and Varieties :—

aculeatum, 2′, Jy., red (*syns.* gariepinum and horridum).
alpinum, 6″, sum., ann. or bien., yel., or., wh.
— pyrenaicum, dwarfer, finer foliage.
arenarium, 1′, sum., ann., pur.
Argemone, 1½′, Je., ann., sc.
californicum, 1′, sum., ann., or., yel.
caucasicum, 1½′, Je., per., red.
dubium, 2′, Je., ann., sc.
Hookeri, 3′, aut., ann., ro. red (*syn.* Rhœas latifolium).

lævigatum, 2′, sum., ann., sc.
lateritum, 2′, My., per., or.
pavoninum, 1½′, sum., ann., sc.
persicum, 1½′, Je., per., red.
pilosum, 2′ to 3′, sum., per., or.
Pollaki, 3′, sum., per., red.
rupifragum, 1½′, sum., per., or.
— atlanticum, 1½′, sum., per., or.
ruporient, 3′, sum., per., or. sc., hybrid (rupifragum × orientale).
spicatum, 2′, sum., per., brick red.

PAPPERITZIA.

A curious little stove Orchid (*ord.* Orchidaceæ), that is probably not represented in any European collection. The only species is Leiboldii, 6″, July, green, yellow.

PARACARYUM.

Biennial or perennial half-hardy and hardy herbaceous plants (*ord.* Borragineæ) that are seldom grown. Propagation, by division and seeds. Any ordinary garden soil.

Principal Species :—

angustifolium, sum., hdy. per., blk.
cœlestinum, 1½′, Aug., bluish wh.
heliocarpum, 1½′, aut., bright bl.
myosotoides, 1½′, Sep., hlf-hdy., bl.

PARADISANTHUS.

Low-growing Orchids (*ord.* Orchidaceæ) that are suited by an intermediate house temperature if grown in peat, sphagnum, and broken crocks. Suspend near the roof glass, and give little water during winter.

Principal Species :—

bahiensis, 6′, sum., wh., pur. (*syn.* Warrea bahiensis).
Moseni, 6′, sum., grn., wh., pur.

PARADISEA. (St. Bruno's Lily.)

Hardy plants (*ord.* Liliaceæ) of considerable attractiveness. Propagation, by division. Any deep, fertile soil suits.

Only Species and Variety :—

Liliastrum, 2′, Je., wh., spotted grn. (*syns.* Anthericum Liliastrum and Czackia Liliastrum).
— major, larger in all its parts than the type (*syn.* Anthericum Liliastrum majus).

PARAFFIN.

In this country it is the common but erroneous practice to call petroleum "paraffin," and in every case where recipes are given for the destruction of insect pests in gardens, petroleum should be correctly substituted for paraffin. Paraffin proper is a crystalline and transparent substance obtained both from wood-tar and some kinds of petroleum, but in recent years the name has had a wider use, and the substance to which Baron Reichenbach gave it in 1830 is now known as paraffin wax. Paraffin oil is part of the product resulting from the distillation of bituminous cannel coal, especially from shale beds. Petroleum exudes from, or is pumped out of, the earth in several regions, notably around Baku in Russia, and in the American States of Pennsylvania and Texas. Kerosene is another name used in the same connection, and is the one used in American handbooks just as paraffin is commonly used in British ones. Kerosene, paraffin, and petroleum, when used to indicate the oil used for domestic lighting, are only names for one and the same liquid, and that the one now largely used in home-made garden insecticides.

Whichever title is used for the material employed in the destruction of many pests, the utmost care is needed in its handling, or not only the pest but the plant also will be killed. Combined with soap and water to form an emulsion, and highly diluted, it makes an excellent material for spraying all crops that are subject to attacks of sawflies and leaf miners, the foliage being thus rendered distasteful to the egg-laying insect. Mixed with wood ashes, at the rate of 1 quart to a barrowload, it forms a useful surface dressing for Carrot and Onion beds, applied immediately after sowing, and again when the seedlings are 2″ high, or directly after thinning, as a preventive against Carrot and Onion flies. For the destruction of mealy bug and scale insects on climbers or other not too tender plants, under glass, paraffin emulsion is most effective in the hands of a careful operator. (*See* Insecticides.)

PARASITIC PLANTS.

Of exceptional interest to botanical students are all those plants that prey upon other members of the vegetable kingdom, for they grow, flower, and fruit with the least expenditure of energy, deriving a large part of their sustenance from the juices of the host. The semi-parasite Mistletoe is the most familiar, and it is not at all particular as to its host, growing well alike on Apple, Thorn, Poplar, Lime, and other trees; the seed germinates in the crevices of the bark, and pushes its special sucker-like processes (haustoria) into the tissues of the host.

Another wonderful British parasite is the Dodder (Cuscuta), which germinates in the soil, but soon becomes parasitic upon Ling, Clover, etc., feeding upon its host and forsaking its earlier terrestrial existence. The Dodder often strangles large areas of Ling and Heather on moors and commons, and not infrequently does considerable damage to fodder crops; it bears no leaves, but flowers and seeds freely.

Some few plants are parasitic upon the roots of others, notably the Broom-rapes (Orobanche) which affect various subjects, the species being determined largely by the plants they are parasitic upon. Hypopitys multiflora (Monotropeæ) is parasitic on Beech and Pine roots, and is occasionally seen in this country.

In the tropics there are numerous parasitic plants, but the most extraordinary of all is the gigantic Rafflesia Arnoldii, which uses species of Cissus, etc., as hosts, and though producing no leaves and no true stem it has a flower that measures 3′ across. This is fleshy, of a dull flesh colour, and gives forth a disagreeable odour. Rafflesia Arnoldii has the largest flower of any known plant.

Papaya (*see Carica*).
Paper Mulberry (*see Broussonetia*).
Paphinia (*see Lycaste*).
Papyrus (*see Cyperus*).
Para Cress (*see Spilanthes*).
Paradise, Grains of (*see Amomum*).

Paragramma (*see Polypodium*).
Paraguay Tea (*see Ilex*).
Paranephelius (*see Liabum*).
Para Nut (*see Bertholletia*).
Para Rubber (*see Hevea*).

Quite apart from the foregoing, but equally parasitic, are the many species of fungi (and bacteria) that prey upon plants, pushing their thread-like mycelia through the tissues of the host; and when it is remembered that many can grow on for a long period independent of reproduction by spores, the difficulties of eradicating fungoid pests will be the better appreciated.

It should here be stated that epiphytic and saprophytic plants are frequently miscalled parasites, but the former use other plants only as a means of support and not of sustenance, while the latter, *i.e.* saprophytes, grow only on decaying organic matter.

PARIETARIA.

Hardy plants (*ord.* Urticaceæ), needing ordinary garden soil; seldom cultivated. The best known species is the British one, officinalis, 1½′, summer, green (Wall Pellitory).

PARINARIUM.

Stove evergreen shrubs and trees (*ord.* Rosaceæ), rarely seen in cultivation. Propagation, by cuttings of ripe wood in spring, beneath a bell-glass, over bottom heat. Soil, fibrous loam, leaf mould, and sand.

Principal Species:—

excelsum, 60′, Je., wh.

PARIS.

Hardy herbs (*ord.* Liliaceæ). Propagated by division of the creeping rootstock, and by seeds. Any fertile garden soil suits.

Principal Species:—

polyphylla, 1′, My., yellowish grn.

quadrifolia, 1′, Ap., yellowish grn.

PARIS GREEN.

An extremely useful arsenical compound that in careful hands assists the grower to overcome the attacks of caterpillars and other pests destructive of the foliage of fruit trees, being both a preventive and a cure. As Paris Green—or Scheele's Green, as it is sometimes called—is a poison, the utmost care must be taken to keep it out of the reach of domestic animals, children, or anyone unacquainted with its nature. Paris Green is obtainable either in powder or paste, but as there is always a danger of inhaling the fine dry particles, the paste form should be purchased. One ounce of this mixed with 20 gallons of water forms a suitable mixture for spraying fruit trees when the leaves have grown somewhat. A good plan is to break down the paste in a little water, gradually adding more water and stirring vigorously all the time. In using the mixture remember that Paris Green is more than three times heavier than water, and that it is insoluble in water, consequently unless the mixture is kept continually agitated the lower portion in the vessel will be so strong as to damage the young foliage. In small gardens a syringe may be used to spray with, distributing the mixture in the finest spray possible; the Strawson and Vermorel patent spraying machines are suitable for larger operations. A quart of treacle added to every 50 gallons serves to make the mixture more adhesive and prevent its effects being lost after the first shower.

In America dry mixtures of Paris Green are sometimes used, and the method is to mix ½ lb. of Paris Green powder with 2½ lb. of wheat flour and 50 lb. of either dry road dust or finely sifted coal ashes.

PARK.

A piece of ground enclosed for purposes of recreation. It may be public or private property. In country estates the ground immediately surrounding the mansion is usually known as the Park, although it is not always entirely enclosed. The deer park is bounded by higher fences or by wide ha-has, surmounted by low fences, so that the deer may be kept within limits. Wooden palings are generally employed for the boundaries, and strung wire fences for the partitions, or for enclosing shrubberies.

The public park, as exemplified in the large open spaces in London and other towns and cities, is comparatively a modern feature. These parks have been laid out by landscape gardeners, planted with suitable trees, and starred with flower beds, in the filling of which much care is expended. They are, in reality, huge gardens, with long, rolling stretches of lawn, shady nooks and arbours, umbrageous trees, and well-kept, pleasant promenades. The employment of the lawns for cricket, bowls, and tennis is quite legitimate, and well within the strict meaning of the word "park."

The park of the private owner is developed upon rather different lines, and in it are to be found features corresponding to the owner's desires; but it may be generally stated that a rather "wilder," more natural state of things obtains in them. The lawns are represented by rough meadows and the shrubberies become woods and cover for game, while there is a gradual transition from these wilder parts to the "kept" portions of the grounds that lie close to the dwelling house.

Recently the tendency has been to add to natural resources by sowing seeds of many wild flowers, and by planting quantities of hardy bulbs, that, once planted, are allowed to take care of themselves; and the results are in every way commendable. (*See also* LANDSCAPE GARDENING.)

PARKIA.

Stove evergreen trees (*ord.* Leguminosæ). Africana—the African Locust—possesses considerable economic value, its seeds being surrounded by a sweet, farinaceous pulp. Propagation, by cuttings in very sandy soil, beneath a bell-glass, over bottom heat. Soil, fibrous peat and loam with coarse sand.

Principal Species:—

africana, 30′, Ap., crim. African Locust.

biglandulosa, 20′, sum., brownish yel., wh.

PARKINSONIA. (JERUSALEM THORN.)

Stove evergreen shrubs (*ord.* Leguminosæ) Propagation, by cuttings in sand, in a close case. Soil, fibrous loam, peat, and sand.

Principal Species:—

aculeata, 10′, Je., yel.

Parastranthus (*see Lobelia*).
Paratropia (*see Heptapleurum*).
Pardanthus chinensis (*see Belamcanda chinensis*).
Pardia (*see Rose Enemies*)
Paris Daisy (*see Chrysanthemum frutescens and Marguerites*).

Paritium (*see Hibiscus*).
Parkeria (*see Ceratopteris*).

PARMENTIERA. (Candle Tree.)

Stove trees (*ord.* Bignoniaceæ). Propagation, by cuttings of side shoots, in sand, beneath a bell-glass, over bottom heat. Soil, peat and loam in equal parts, with sand.

Principal Species :—

cereifera, 20′, sum., wh. This species has remarkable pendent fruits of a yellowish colour, from 2′ to 4′ long and 1″ in diameter, looking like huge candles.

PARNASSIA.

Hardy herbaceous perennials (*ord.* Saxifrageæ). Propagation, by division in spring; also by seeds sown at that period, or in late summer. Soil, moist, in a shady position.

Principal Species :—

caroliniana, 6″, Jy., wh. (*syn.* speciosa).
nubicola, 1½′, sum., wh.
palustris, 6″, Jy., wh., veined grn. A charming native bog plant. Common Grass of Parnassus.

PARROTIA.

Hardy deciduous trees (*ord.* Hamamelideæ). Propagation, by cuttings in spring, under a hand-light. Soil, peat, loam, leaf mould, and sand.

Only Species :—

jacquemontiana, 10′, sum., grn., wh.
persica, 15′, sum., sc., lvs. finely coloured in aut. (*syn.* Hamamelis persica). Iron Tree.

PARRYA.

Hardy perennial herbs (*ord.* Cruciferæ), allied to Arabis. Propagated by division, and thriving in any garden soil. They are of no particular garden value.

PARSLEY.

Description.—This, Carum Petroselinum (*ord.* Umbelliferæ), is the most valuable of all the garden herbs, and is in constant demand for flavouring and garnishing. For the latter purpose particularly, a variety with finely curled leaves of a bright green colour must be selected.

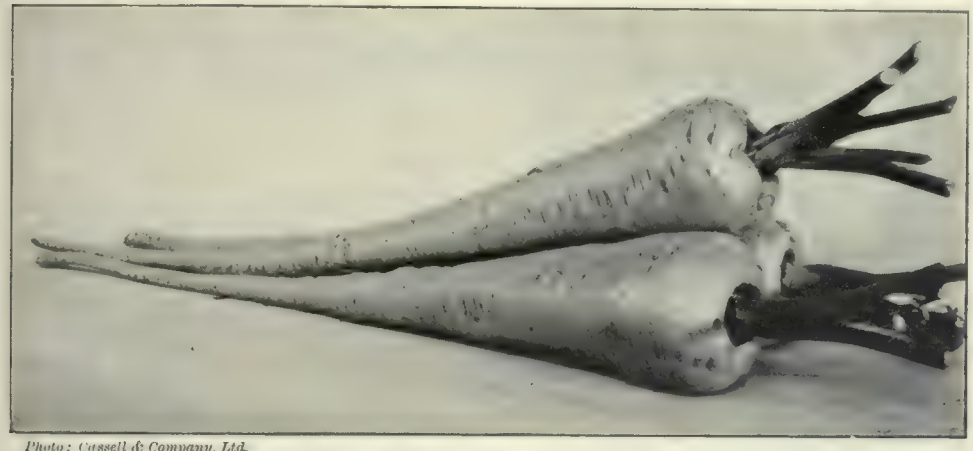


Photo: Cassell & Company, Ltd.

Dobbie's Prize Parsnip (*see p.* 164).

Other Species :—

asarifolia, 6″, Jy., wh.
fimbriata, 6″, Jy, wh.
parviflora, 6″, Je., Aug., wh.
speciosa (*see* caroliniana).

PAROCHETUS. (Shamrock Pea.)

A hardy herbaceous creeper (*ord.* Leguminosæ). Propagation, by division in spring, or by cuttings beneath a handlight in summer. Soil, loam and leaf mould with sand. Some protection must be afforded in winter.

Only Species and Variety :—

communis, 2″, pur. bl.
— major, 3″, Je., lil.

PARONYCHIA. (Nailwort, Whitlow Grass.)

Hardy herbaceous plants (*ord.* Illecebraceæ) of tufted habit. Propagation, by seeds sown in spring. Any light garden soil suits.

Principal Species :—

argentea, 9″, sum., wh., bracts and stipules silvery.
capitata, 9″, Jy., wh. (*syn.* Kapela).
serpyllifolia, 4″, Jy., wh.

Parnassus, Grass of (*see Parnassia palustris*).

Propagation.—By seeds sown in drills near the edges of borders in the kitchen garden, or in small beds. Thin sowing is essential, and very liberal thinning, as it is only the plant that stands absolutely alone which attains to perfection. If only one sowing is made, it should be in April; if successionally, it must be from the end of January to July, according to requirements.

Soil.—Parsley will thrive in any ordinarily fertile garden soil, but the greatest success is achieved on deeply worked mellow loam.

Other Cultural Points.—When the plants commence to become coarse they should be cut closely over. This serves two purposes. It retards flowering, which spoils the plant, and it encourages the production of a crop of good, young foliage. In gathering, never completely defoliate a young plant, but take a small number of leaves from several plants. Though Parsley is very hardy, the plants for winter, unless in a favoured spot, are best protected with a frame or other shelter.

Good Varieties :—

Dobbie's Curled.
Moss Curled.

Parrot Beak Plant (*see Clianthus*).
Parsley Fern (*see Cryptogramme crispa*).

PARSNIP.

Description.—One of the most valuable tap-rooted vegetables. It has come into some disrepute owing to bad cooking. The Parsnip (Peucedanum sativum, *ord.* Umbelliferæ) must be boiled and served whole to ensure its true flavour and highest nutritive properties being retained.

Propagation.—By seeds sown in drills about 15″ asunder as soon as the weather and soil are favourable, towards the end of February or in March. The seedlings should eventually stand 10″ or 12″ asunder in the rows.

Soil.—A deeply worked, moderately strong loam is best, no fresh manure being necessary or desirable. If possible, the land should be worked in autumn, and be left rough until the time for sowing. If the land be very poor, add some decomposed manure to the second spit, but none to the top soil.

Harvesting and Storing.—The Parsnip is a very hardy plant, which may safely remain in the ground through the winter. The difficulty lies in getting roots during hard frosts. Some should therefore be lifted in November, have the bases of the leaf stalks cut closely down, and be stored in a cool cellar or other suitable place in sand or fine soil. (*See* CARROTS.)

Parsnips for Exhibition.—When perfectly clean, straight roots are required for exhibition they are usually secured by boring. A hole about 2′ to 3′ deep is made with a crowbar, and is moderately firmly filled with a mixture of loam, leaf mould, and sand, three seeds are sown in the top, and, germination having taken place, the finest seedling is selected for retention, the others being thrown away. The roots go straight down, and perfection is almost invariably ensured.

Parsnip Fly.—The leaf miner fly that attacks Celery turns its attention to Parsnips at times. (For remedies, *see* CELERY FLY.)

Parsnip Canker.—A minute fungus attacks the roots, and leaves patches of brown on the skin, usually towards the top of the roots. It is exceedingly difficult of eradication. The position of the Parsnip bed should be changed annually, and infested ground should be heavily dressed with lime.

Good Varieties :—

Dobbie's Prize (*see p.* 163).
Hollow Crown.
The Student.

PARSONSIA.

Greenhouse climbing shrubs (*ord.* Apocynaceæ). Propagation, by cuttings in summer of side growths getting firm, in very sandy soil. A compost of light loam and leaf mould suits.

Principal Species :—

albiflora, My., cl., cream, wh.
velutina, 10′, Jy., wh.

PARTHENIUM.

Parthenium Hysterophorus is a half-hardy annual (*ord.* Compositæ). Propagated by seeds. Ordinary garden soil.

Principal Species :—

Hysterophorus, 3′, sum., hlf-hdy., whitish. Bastard Feverfew.

Partridge Berry (*see Gaultheria and Mitchella*).
Partridge Pea (*see Heisteria*).

PASCALIA.

Half-hardy herbaceous perennials (*ord.* Compositæ). Propagation, by division, or by cuttings beneath a hand-light in summer. Any fertile soil suits.

Principal Species :—

glauca, 1½′, Jy., yel.

PASITHEA.

The only member of this genus (*ord.* Liliaceæ) is closely allied to Anthericum. It is half-hardy except in warm localities and light soils. Propagation, by division and seeds. Soil, light loam with plenty of leaf mould.

Only Species :—

cærulea, 2′, Ap., pale purplish bl.

PASPALUM. (MILLET GRASS.)

A genus of hardy, greenhouse, and stove Grasses (*ord.* Gramineæ), of no garden value. Millet, or Indian Millet, is Sorghum vulgare, which *see*.

PASSERINA.

Greenhouse evergreen shrubs (*ord.* Thymelæaceæ). Propagation, by cuttings of half-ripe wood in April, in sand. Soil, sandy peat, with lumpy, fibrous loam.

Principal Species :—

empetrifolia, 2′, Jy., yel. (now Thymelæa dioica).
filiformis, 1½′, Jy., wh.
grandiflora, 1½′, My., wh. (now Cryptadenia grandiflora).
hirsuta, 2′, Je., wh.

Other Species :—

Ganpi (now Wikstrœmia canescens var.).
laxa, 1′, Je., wh. (now Arthrosolen laxus).
spicata, 1¼′, My., wh. (now Arthrosolen spicatus).
Thunbergii, 3′, My., wh. (now Gnidia sericea).

PASSIFLORA. (PASSION FLOWER.)

Description.—An important genus of hardy greenhouse and stove climbers (*ord.* Passifloreæ). The majority of the species are valuable for the striking beauty of their flowers, and a few, such as quadrangularis and edulis, produce edible fruits under proper cultivation.

Propagation.—By cuttings of young shoots in summer, affording the tender species bottom heat and a bell-glass, and the hardier cærulea and its varieties a hand-light. Seeds of cærulea germinate freely if sown as soon as ripe, and the seedlings will flower the second year.

Soil.—Equal proportions of peat and loam, both fibrous, with some coarse sand.

Other Cultural Points.—When planted out under glass it is found advisable to restrict the root run to a narrow bed or border, and the soil to about 1′ in depth, otherwise the plants will prove overluxuriant. Pruning should be done after flowering, and may be light or severe according to the space at command. When growth is free, regulate and support it, prevent crowding, and allow the branches to depend gracefully from the trellis or wires, as this brings the flowers into greater prominence, and beautifies the structure. Fumigation, and the use of insecticides, are necessary at intervals. to ensure cleanliness and health.

Principal Species and Varieties :—

alata, 20′, sum., st., crim., wh., pur.; brasiliana is a var. with sc., vio. flowers.
amabilis, 15′, spr., st., sc., wh.
cærulea, 30′, hdy. in southern counties and

Pasque Flower (*see Anemone Pulsatilla.*)

sheltered spots, sum., aut., wh., bl., pur. Fine vars. are Colvillei and Constance Elliott, wh., fine grh. climber.
edulis, 25′, sum., st., wh., pur., fruits edible, pur., with or. pulp; sometimes exhibited in collections of fruit. The Granadilla (*see* figure).
incarnata, 30′, sum., hlf-hdy., best grown in grh., growths annual, and herbaceous from perennial rootstock, wh., pur., grn.
quadrangularis, 20′, sum., aut., st., wh., red, vio., fragrant, fruits greenish yel., pur. pulp, edible. The flowers should be artificially fertilised.
racemosa, 20′, spr. to aut., st., sc. (*syn.* princeps).
raddiana, 25′, aut., st., deep red, pur. (*syn.* kermesina).
violacea, 20′, sum., st., lil., vio., bl.
watsoniana, 20′, sum., st., wh., vio., lil., grn.

Principal Hybrids :—

Belottii (cæruleo-racemosa × quadrangularis), 20′, sum., st., pk., ro., bl., pur.
Buonapartea (alata × quadrangularis), 20′, sum., st., red, blk., wh.
cæruleo-racemosa (cærulea × racemosa), 20′, sum., hlf-hdy., aut., pur.
Impératrice Eugénie (cærulea × quadrangularis), 25′, sum., st., wh., red, pur., bl.
kewensis (raddiana × cærulea), 25′, sum., st., red, pur.
Madonna (racemosa × Buonapartea), 20′, sum., st., red, pur.
Munroi (alata × cærulea), 25′, sum., grh., wh., vio., pur. (*syn.* Pfordtii).

Other Species, Varieties, and Hybrids :—

arborea, 12′, st., Je., wh., yel.
atropurpurea, 20′, sum., st., vio., red. A garden form.
capsularis, 20′, sum., st., yel., grn.
cardinalis of gardens (*see* amabilis).
cincinnata, 20′, sum., grh., vio. pur., wh.
cinnabarina, 20′, spr., st., red.
coccinea, 20′, sum., aut., st., sc., or. (*syn.* fulgens).
fulgens (*see* coccinea).
Hahnii, 20′, sum., grh., wh., yel. (*syn.* Disemma Hahnii).
herbertiana, 30′, sum., aut., st., wh., yel. (*syn.* Disemma herbertiana).
insignis (*see* Tacsonia insignis).
kermesina (*see* raddiana).
lawsoniana (alata × racemosa), 20′, sum., st., reddish br., red.
Loudoni (raddiana × racemosa), 20′, sum., st., reddish pur.
macrocarpa, 25′, sum., st., wh., pur., fruits large, edible.
Pfordtii (*see* Munroi).
princeps (*see* racemosa).
pruinosa, 20′, sum., st., grn., wh., lil.
rubra, 15′, spr. to aut., st., greenish yel., red.
trifasciata, 15′, sum., st., wh., fragrant.
vitifolia, 25′, sum., st., yel., or., wh.

PATAGONULA

Evergreen greenhouse trees (*ord.* Borragineæ). Propagation, by cuttings in spring, in sand, beneath a bell-glass, over bottom heat. Soil, fibrous peat and sandy loam.

Principal Species :—

americana, 10′ to 12′, Jy., wh. or greenish wh.

PATERSONIA.

Herbaceous perennials (*ord.* Irideæ) needing greenhouse shelter. Propagation, by division and seeds. Soil, loam, leaf mould, and sand.

Principal Species :—

glabrata, 1½′, Je., pur. (*syn.* media).
glauca, 1½′, Je., bl.
longiscapa, 1½′, Je., bl.
occidentalis, 1½′, Je., bl. (*syn.* sapphirina).
sericea, 1½′, Je., bl.

Pastinaca (*see Peucedanum*).
Patience, Herb (*see Rumex Patientia*).

PATRINIA.

Hardy plants (*ord.* Valerianeæ). Propagated by seeds. Light soil.

Principal Species :—

heterophylla, 1′, My., per., yel.
scabiosæfolia, 1′, Je., bien., yel. (*syn.* serratulifolia).
sibirica, 1′, Je., bien., yel. (*syn.* Valeriana ruthenica).

PAULLINIA.

Evergreen stove climbers (*ord.* Sapindaceæ), prized for their Fern-like leafage. Propagation, by

Photo : D. S. Fish. Edinburgh.

The Granadilla, Passiflora edulis.

cuttings of ripe wood in very sandy soil, beneath a bell-glass, over bottom heat. Soil, loam, leaf mould, and sand.

Principal Species and Variety :—

Cupana, 20′, Je., wh.
japonica (now Vitis serjaniæfolia).
oceanica, 12′, sum., wh.
thalictrifolia, 15′, aut., pk.; a very useful subject.
— argentea, silvery grey lvs.

PAULOWILHELMIA.

Shrubby stove plants (*ord.* Acanthaceæ). Propagation, by division or cuttings. Soil, loam, peat or leaf mould, and sand.

Principal Species :—

speciosa, 2½′, sum., bl., yel.

PAULOWNIA.

Description.—A handsome Japanese deciduous tree (*ord.* Scrophularineæ), not perfectly hardy in cold districts. It grows rapidly, and is valuable for its splendid foliage.

Propagation. — By cuttings of young shoots getting firm at the base, in sandy soil, beneath a hand-light.

Soil.—Deep, mellow loam.

Other Cultural Points.—An excellent use of this plant has been made at Kew, where one of the largest beds is devoted to it. The growths are cut right down each spring, and the shoots that push from the basal buds are reduced to one on each plant. The result is a strong, erect growth rising 10′ high and furnished with huge and handsome leaves, producing a striking effect. Each plant is given just room to properly develop. Heavy dressings of cow manure are given, and in the heat of summer copious waterings are afforded. Under this treatment it is necessary to renew the beds every seven or eight years, the culture being so exhausting.

Photo : Cassell & Company, Ltd.

PAULOWNIA IMPERIALIS.

Only Species :—

imperialis, 30″ to 40″, Je., pale vio. (*syns.* tomentosa, Bignonia tomentosa, and Incarvillea tomentosa, *see* figure).

PAVETTA.

Stove evergeen shrubs (*ord.* Rubiaceæ) allied to Ixora. Propagation, by cuttings of half-ripened growths in spring, in sandy soil, in a close case. Soil, equal parts of fibrous peat and loam, with coarse sand.

Principal Species :—

borbonica, 4′, lvs. olive grn., spotted wh., central rib red. A pretty foliage plant.
caffra, 4′, sum., wh. (*syn.* corymbosa).
indica, 4′, aut., wh.

PAVIA.

Hardy, ornamental, deciduous trees (*ord.* Sapindaceæ). Propagation, by seeds, layers, buds, and grafts. Soil, moist, rich loam. Alba (correctly Æsculus parviflora) is useful for beds and shrubberies.

Principal Species :—

alba, 8′ to 10′, aut., wh.
californica, 20′ to 30′, sum., wh. (now Æsculus californica).
indica, 50′ to 70′, Jy., wh. (now Æsculus indica).
macrostachya (*see* alba).
rubra, 8′ to 40′, Je., red (now Æsculus Pavia).
— atrosanguinea, dark red.

PAVONIA.

Evergreen stove shrubs (*ord.* Malvaceæ) allied to Goethea. Propagation, by cuttings in sand, in a close case. Soil, fibrous loam and sand.

Principal Species :—

coccinea, 2′, sum., sc.
multiflora, 1½′, aut., pur., red (*syn.* Wiotii).

Other Species :—

intermedia (*see* Goethea intermedia).
— kermesina (*see* G. i. kermesina).

makoyana (*see* G. makoyana).
malacophylla (*see* Velutina).
Schrankii, 2′, Jy., or. yel.
Velutina, 3′, Aug., red (*syn.* Lopimia malacophylla).

PEA.

Description.—Of all vegetables grown in British gardens, the Pea (Pisum sativum, *ord.* Leguminosæ) is the most nutritious, and probably, with the exception of the Potato, the most popular. It is richly nitrogenous, and this proves a disadvantage to some constitutions, to which Peas act almost as a poison.

Soil.—The Pea is one of the grossest feeders among vegetables, and demands a deeply worked, heavily manured soil, with which alone can the best results be secured. Natural manure, supplemented with a little muriate of potash and superphosphate of lime, gives better returns than natural or artificial manures alone. It is desirable that rank manure be placed at the bottom of the first spit of soil, and that heavier applications be made to the main and late crops than to the early ones.

Early Crops.—It used to be the rule to sow early, round-seeded Peas, such as William I., Dickson's First and Best, and others, on a warm border in November, but the disadvantages are so many that the practice has largely fallen into desuetude. Seeds of similar sorts, as well as the more modern dwarf Early Marrowfats, are sown in pots, boxes, or on strips of turf in frames or greenhouses, early in February. Pots should only be employed where suitable boxes or turves are not conveniently procurable. Boxes 24″ by 6″ by 4½″, with movable sides or ends, answer, being filled with light, rich soil; or boxes 24″ by 12″ by 4″ may be employed, distributing the seeds 2″ asunder over the whole surface. The boxes are stood in frames or greenhouses, but never in strong heat. With careful attention, and a gradual course of hardening, the plants will be ready for planting as soon as the weather is favourable in March or April. If turves are used they can be 24″ by 3″ by 1½″. A row of seeds is placed down the centre, and the treatment is similar to that of box-grown stock.

Sowing Out of Doors.—Seeds should be sown in drills about 2″ deep, the distance apart of the rows being governed by the known height of the variety. A safe rule is to have the rows twice as far apart as the plants grow high. Thus for a Pea growing 3′ the rows should be 6′ asunder, the space between being cropped with other vegetables.

Protecting Seeds and Seedlings.—Mice will eat the seeds, and where prevalent the seeds before sowing should be damped and then shaken in a bag containing some red lead. Trapping should also be resorted to. Slugs will take the shoots just pushing from the seed. Lime is useful, but in bad cases hand-picking at night with a lantern should be adopted. Birds are destructive to the young plants, which must be protected with galvanised wire guards, or with a home-made contrivance of wood and string.

Staking.—This should be done very early, before the young plants show the slightest tendency to fall over. Use good stakes, with ample side growths, to which the plants may cling.

Peas for Exhibition.—Where very fine pods are wanted for exhibition suitable varieties, like Duke of Albany, should be grown, the number of pods on a plant must be strictly limited, the top must be taken from the plant, and generous feeding must be given.

Thinning the Plants.—This is much neglected. Plants of early varieties should be 2″ apart, and of stronger-growing main crop and late sorts from 3″ to 4″ asunder in the rows.

Forcing Peas.—In large gardens this is an important operation. Suitable varieties should be chosen, such as Chelsea Gem, the Sutton Forcing, and the newer Edwin Beckett. Ten-inch or 12″ pots should be three parts filled, after drainage has been supplied, with a compost of loam, leaf mould, and road grit, and the seeds sown very thinly and then covered. December is the time to make the first sowing. Strong heat should be avoided, and the plants should have all possible light and air. When the plants have made a good start the pots should be filled to within 1½″ of the rim, be staked, and be regularly watered with pure water and occasionally with weak liquid manure. Dwarf varieties may be grown in pits and frames, the seeds being sown in drills in good soil.

Gathering Peas.—The more frequently the pods are picked the longer the plants will continue in bearing. Immediately a pod is fully developed it should be gathered, as it soon afterwards commences to lose in flavour and tenderness, and, turning towards seed development, takes more than its share of nourishment, thus robbing other pods on the same plant.

Pea Mildew.—This fungus (Erysiphe Martii) may usually be taken as an indication that the plants are not getting sufficient nourishment, and may arise from a lack of food in the soil, or from dryness, when the contained food would not be available for imbibition. In the former case apply liquid manure in at least three forms, such as from natural manure, from soot, and from nitrate of soda. In the latter event water heavily with pure water, and the trouble will usually be easily overcome.

Pea Mould.—This is caused by a fungus (Peronospora Viciæ), and it usually occurs in close, damp weather. Crowding favours its spread.

Selection of Varieties:—

For Forcing:—

Chelsea Gem.	Edwin Beckett.
Early Morn.	The Sutton Forcing.

For General Crop, in Order of Readiness:—

*Chelsea Gem, 1′.	*Gladstone, 3′.
Gradus, 3′.	Edwin Beckett, 4′.
Early Giant, 4′.	Duke of Albany, 5′.
*Duchess of York, 4′.	*Sharpe's Queen, 3′.
*Daisy, 1½′.	Ne Plus Ultra, 6′.
Senator, 2′.	*Autocrat, 4′.

If only six are required, choose those marked thus *.

PEA, SWEET (*see* SWEET PEA).

PEACH.

Description.—The Peach (Prunus Persica, *ord.* Rosaceæ), and its smooth-skinned sport, the Nectarine, constitute two of the choicest fruits. Well-grown fruits have a juicy lusciousness that has scarcely a rival, and certainly cannot be excelled. The Peach is supposed by De Candolle to be a native of China, and it was introduced to Italy in A.D. 41–54, appearing in England some 1,500 years later.

Paxtonia (*see Spathoglottis*).

Propagation.—By seeds for new varieties and for stocks upon which to work other varieties by budding. (*See* BUDDING.) These stocks are not, however, equal to the Plum, and particularly to the varieties Damas Noir and St. Julien, which give a hardy, long-lived tree. Whip grafting (*see* GRAFTING) may also be adopted, but is not generally so satisfactory as budding.

Soil.—Any porous soil of a loamy character may be expected to produce excellent Peaches and Nectarines. Lime in the form of mortar rubbish may be applied if the soil be deficient in this mineral. The drainage must be perfect, and firm planting is essential.

On Trellises under Glass.—Magnificent Peaches and Nectarines are grown in houses either trained fan-shape on a trellis under the sloping roof, or planted back to back on trellises standing across the house. The supporters of the latter system claim more profitable results, but the fruits are usually slightly smaller and duller in colour than those from the former system. Whichever method is adopted, the management will be precisely the same. A good fan-trained tree will have six to eight foundation branches whence spring the bearing growths, which are usually renewed annually, though both Peaches and Nectarines will bear on spurs. Where a large selection of varieties is required and space is restricted, the U-shaped tree will be found valuable. The trees should be planted in thoroughly good but not rich soil. Richness and looseness encourage gross, sappy wood, which never produces fruits. The growths that have carried fruits are cut out when they have perfected their burden, and others are trained-in to bear a crop the following year.

Routine Work.—Dryness at the roots is fatal to success, and must be guarded against. Afford mulchings of short manure to the trees, as these encourage fibrous root action just beneath the surface. Syringing must be done at intervals, which will vary with the external atmospheric conditions, as well to promote growth as to keep insect pests in check. The tips of the shoots must be pinched out in the summer, and those not required in subsequent years should be removed. Disbudding will be necessary, and must be done in two or three stages, and thinning of the fruits must be done until the finishing crop will range at one for every square foot of trellis; but in this each grower must use his own judgment. Overcropping means exhaustion, and is often the cause of bud-casting.

Temperatures.—The heat should be gradually increased with the progress of the trees. At the flowering stages a night temperature of 40°, with an increase of 10° by day artificially, is suitable, and sun heat may raise it a further 10° or 15°, but there must be free ventilation. This will increase with the advance of the fruits until at the last swelling it may be taken to 65°, when ventilation must be fairly free. When the fruits are ripening there must be full ventilation at 75°. In forcing for fruit in May, start the trees early in December; for June, four weeks later; for early in July, first week in February; and for mid-July, early in March; later crops come from trees that start naturally.

PEACH GLADSTONE (*see p.* 169).

Trees in Pots.—These are steadily gaining in favour for culture in orchard houses (which *see*). Excellent crops are produced, and the plants are well within the control of the grower. Repotting should be done every year, or every alternate year, and the trees must be generously fed. As in the case of trees on trellises, a pronounced resting period is absolutely essential.

Trees on Outdoor Walls.—Peaches and Nectarines are most admirable for walls facing due south in cold climates, and south-east or south-west in more favoured places. If the trees are properly managed, similarly to those under glass, they will produce superb fruits. Protection is necessary during the blossoming period, and can be readily afforded by blinds running up to temporary

overhanging copings fixed to the top of the wall. Whatever protective material is used must stand quite free from the flowers. Watering is one of the most important factors in successful culture.

Peach Blister.—This usually attacks the leaves, but sometimes the young shoots as well. It is a fungus (Exoascus deformans) which occurs in cold springs after sharp winds and frosts. This points to the need for careful protection. Infested leaves and shoots should be gradually removed and burned, when, with good culture, the tree will make clean, healthy growth.

Selections of Varieties :—

First Early (middle to end of July) :—
Early Beatrice. Early Rivers. Waterloo.

Second Early (beginning to middle of August) :—
Dagmar. Hale's Early. Large Early Miguonne.

Early Midseason (latter half of August) :—
Crimson Galande. Gladstone (*see p.* 168).

Midseason (first half of September) :—
Bellegarde. Dymond. Stirling Castle.

Late Midseason (second half of September) :—
Barrington. Prince of Wales. Sea Eagle.

Late (first half of October) :—
Golden Eagle. Nectarine. Osprey.

For outdoors (in order of ripening) :—
Hales' Early. Noblesse. Walburton
Amsden June. Barrington. Admirable.
Dymond. Sea Eagle. Salwey.

PEAR.

Description.—The Pear (Pyrus communis, *ord.* Rosaceæ) is one of the most highly appreciated hardy fruits for dessert, while many persons have a great partiality for it in a cooked state. The tree is not so accommodating as the Apple, there being districts where wall culture is essential to a regular crop of properly finished fruits. Where the Pear thrives either as a standard on the Pear stock or as a pyramid on the Quince, it is usually very profitable.

Propagation and General Management.—These details are practically identical with those adopted in the case of Apples, the article upon which should be studied with care.

Stocks.—The natural stock is the Pear, which is deep-rooting, and is somewhat slow in producing a profitably fruitful tree ; it is suitable for standards. The Quince stock acts with Pears as the Paradise does with Apples—favours early fruiting and excellence of quality. But some varieties—Marie Louise, for example—do not favour the Quince, and double grafting is resorted to. The stock is worked with Beurré d'Amanlis or other suitable variety, which in its turn is headed back, and the coveted Marie Louise worked thereon. Success follows this method.

Pear Nouvelle Fulvie (*see p.* 170).

Soil and Situation.—Provided there be a deep root run and no stagnant water, the Pear will grow in any fertile soil. If the drainage is bad it must be rectified, as Pears on damp or shallow soils will crack and be useless. Even pyramids on the Quince—a moisture-loving tree—will fail if the ground be at all waterlogged. This stock is naturally surface-rooting, and no effort should be spared to maintain the character. Pears vary considerably in different climates, and standards are a doubtful success in most northerly or cold situations, and fail completely in others. The large varieties prefer walls, and several of the small sorts grow best as standards, some of them fruiting well even in cold places. Trained Pears on the Pear stock cover an immense area of wall, and, if they are properly nourished, carry enormous crops.

Form of Trees.—For the open, in the form of pyramids and, where they thrive, standards. For walls, horizontal and fan shapes are excellent, but for the choicest of fruits for exhibition cordons are unequalled. Arches over garden walks formed by cordon Pears have two recommendations—they

Peacock Butterfly (see Vanessa).
Peacock Tiger Flower (see Tigridia Pavonia).

are ornamental, and they are useful. In growing cordons it is important that the leader be allowed space for extension, as restriction is almost invariably followed by ill effects.

Gathering and Storing.—Pears should be gathered before they become dead ripe, but not much, or they quickly shrivel and become useless. Though generally stored with Apples, they develop a much superior flavour when kept in a slightly warmer temperature.

Pear Canker.—Though not generally so serious as in the case of Apples, the fungus, Nectria ditissima, has to be reckoned with. (For preventives and remedies, *see* CANKER.)

Cracking.—This is caused by the fungus Cladosporium dendriticum pyrinum, and it does much damage. Preventive measures in the form of good cultivation are best. Where infestations are serious spray with a solution of 1 lb. of copper sulphate to 25 gallons of water just as the blossom buds begin to swell; and follow, just prior to the flowers expanding, with Paris Green, 1 oz. to 20 gallons of water (*see* PARIS GREEN).

Selections of Varieties :—

Twenty-four dessert Pears in their order of ripening. If only twelve are required, choose those marked * ; if only six, for excellent flavour, those marked *†.

*Jargonelle.
*†Williams' Bon Chrêtien.
*Beurré Superfin.
Souvenir du Congrès.
Louise Bonne de Jersey.
Beurré Hardy.
†Marie Louise.
Gansel's Bergamot.
Maréchal de la Cour.
*Pitmaston Duchess.
*†Doyenné du Comice.
*Emile d'Heyst.
Beurré Diel.
*†Thompson's.
*Beurré Baltet Père.
*†Glou Morçeau.
Beurré d'Anjou.
Nouvelle Fulvie (*see p.* 169).
Knight's Monarch.
*†Winter Nelis.
Nec Plus Meuris.
*Joséphine de Malines.
Bergamotte Esperen.
Doyenné d'Alençon.

Pears for Stewing.—If only one is required, choose *.

*Catillac.
Uvedale's St. Germains.
Vicar of Winkfield.

PEAT.

Vegetable matter found in quantity in a more or less decomposed state and closely compressed, is called peat. It is formed chiefly of marsh plants, such as Mosses, Rushes, Reeds, etc., but sphagnum moss is probably the most common constituent of peats. The formation of peat chiefly occurs in temperate climates. The method of formation is easily seen in a bog; the surface is generally covered with living plants, while below there is a decomposing mass of vegetable matter, and still lower down firm peat is found, and this in some cases passes by insensible degrees into what is known as Brown Coal, Wood Coal, or Lignite, especially where the bog has contained more highly organised plants than those usually found in such places. Bog peat has high antiseptic properties, and consequently is a preservative of many subjects, vegetable and animal. Cut into turves, and stacked to dry, peat forms an important item of fuel in those districts where it abounds, more especially in Ireland, Scotland, some parts of England, and in Denmark, Germany, and Holland.

The peat that is employed in such large quantities for Orchids and other peat-loving plants is of a totally different nature. It is invariably cut from uplands, and is almost wholly composed of such plants as thrive on upland commons, where the soil is usually very sandy. Of these Ling and Heather are the chief, though the Brake Fern occurs abundantly in some places; the fine roots of some annual Grasses also have a place.

The material so largely used in the cultivation of American plants, Orchids, and Heaths is also known as peat, but this differs from the true peat. Orchid peat is composed almost wholly of brown root fibres, and is very porous. On the other hand, the variety known as Rhododendron peat has more earth and fewer fibres, is sandy, and more retentive of moisture than Orchid peat.

PEAT PLANTS (*see* AMERICAN PLANTS).

PECTIS.

A small genus (*ord.* Compositæ) of half-hardy annuals of no special horticultural value. They may be treated similarly to Ten-Week Stocks. The principal species is angustifolia, 6″, summer, yellow, fragrant.

PEDALIUM.

The principal species of this genus (*ord.* Pedalineæ) is murex, a branching, tender annual, with yellow flowers. It has probably been lost to cultivation.

PEDICULARIS. (LOUSEWORT.)

Very few Pedicularises (*ord.* Scrophularineæ) appeal to the cultivator. Most are hardy perennial herbs, and two are common British plants. All are partly parasitic on the roots of other plants. Propagated by seeds. Soil, moist peat.

Principal Species :—

dolichorhiza, 1′ to 1½′, sum., hdy. per., yel.
flammea, 6″ to 12″, My., Je., hdy. per., red.
palustris, 6″ to 18″, sum., hdy. ann., pk. or ro.; British. Marsh Lousewort.
Sceptrum-Carolinum, 3′ to 4′, Aug., hdy. per., golden yel. Charles's Sceptre.
sylvatica, 3″ to 10″, Ap., Jy., hdy. per., ro., pk., or wh.; British. Field Lousewort.
verticillata, 6″ to 12″, My., Je., hdy. per., ro. or wh.

PEDILANTHUS.

Stove shrubs (*ord.* Euphorbiaceæ), whose fleshy branches present a curious appearance. Propagation, by cuttings, which should be allowed to dry before being inserted in sand in a warm, dry house. Soil, sandy loam three parts, rotten cow dung one part.

Principal Species and Varieties :—

tithymaloides, 4′ to 6′, involucre grn. (*syns.* Euphorbia carinata and E. canaliculata). Jew Bush.
— cucullatus, lvs. margined wh. and cupped or hooded.
— variegatus, variegated, not cupped or hooded.

PELARGONIUM, CAPE.

Description.—About 200 species, chiefly from the Cape of Good Hope, belong to this genus (*ord.* Geraniaceæ). The cultivated plants need greenhouse protection, and are perennial, evergreen, and shrubby. Quite a number have tuberous roots, and many have succulent stems. A few are herbaceous, the most interesting of these being

Pearcea (*Isoloma hypocyrtiflorum*).
Pearl Cud Weed (*see Anaphalis margaritacea*).
Pea, Tangier (*see Lathyrus tingitanus*).
Pekea (*see Caryocar tomentosum*).

endlicherianum; there are also a few others—seldom cultivated—that are annual or biennial. The popular species and varieties have fragrant foliage, more or less lobed or divided, and, though the flowers are not large, they are freely produced and prettily marked or shaded.

Propagation.—By seeds, sown as soon as ripe, or in spring, in gentle heat. By cuttings of firm growths, taken at any season of the year, preferably spring or autumn; during the latter period little or no artificial heat will be necessary. Sandy loam, with leaf mould added, should be used. Tuberous- and fleshy-rooted species by root cuttings, 2″ long, placed in very sandy soil, in a temperature of 60°. Keep moderately dry until new leaves have formed.

Soil and Potting.—Good turfy loam, leaf mould, and sand. If the loam is poor, add a little decayed manure. Afford ample drainage and pot firmly. Pelargoniums require comparatively little root room, even for large bushes.

Other Cultural Points.—During summer and early autumn full exposure to sun and air is necessary to ensure ripened growth that will stand the winter safely in a cool house. From June to September no protection is necessary for established specimens. Water sparingly during winter, and withhold the supply altogether from tuberous-rooted and succulent-stemmed species at that season. (*See also* GERANIUM, ZONAL.)

Principal Species and Varieties:—

capitatum, 3′, Je., rosy pur., Rose scented.
citriodorum, 3′, Jy., wh., Citron scented (*syn.* citrosmum).
— minimum, small lvs.
crispum, 3′, aut., pur. (*syn.* crassifolium).
— majus, larger.
denticulatum, 4′, sum., pk. or pur.
— filicifolium, lvs. deeply cut.
— majus, strong growing.
endlicherianum, 2′, sum., hdy. herbaceous per. in warm parts, ro.
fragrans, 2½′, sum., wh., veined red, Nutmeg scented.
inquinans, 2½′, Jy., sc., ro., wh. (*syn.* cerinum).
quercifolium, 4′, spr., pk. or pur., Oak-leaved.
Radula, 4′, Je., pur., Balsam scented.
— major.
tomentosum, 3′, sum., wh., Peppermint scented (*syn.* corymbosum).
zonale, 2½′, Aug., variable, sc., red, crim., wh.; vars. amœnum, leucanthum, and stenopetalum.

Selection of Garden Varieties and Hybrids:—

Duchess of Devonshire, 1½′, sum., blush wh., maroon, crim.
Fair Ellen, 2′, sum., ro., Oak-leaved.
Lady Mary Fox, 1½′, aut., win., sc., Citron scented.
Lady Plymouth, 2′, sum., lil., lvs. variegated.
Little Gem, 2′, sum., ro.
Lothario, 1½′, sum., vio., crim., maroon.
Mrs. J. Douglas, 1½′, aut., win., mauve, ro., maroon.
Pretty Polly, 1½′, sum., Almond scented.
Prince of Orange, 1½′, sum., Orange scented.
Rollisson's Unique, 4′, sum., aut., dark crim.
Scarlet Unique, 4′, sum., aut., sc., maroon.
Shottesham Pet, 1′, sum., rosy pur., Filbert scented.

Other Species, Varieties, and Hybrids:—

atrum, 8″, sum., tuberous, br. (*syns.* hirsutum and melananthum).
betulæfolium (*see* cordatum).
betulinum, 3′, Jy., pur.
bicolor, 2′, Jy., pur., blush.
carnosum, 2½′, spr., wh., pk.
cerinum (*see* inquinans).
citrosmum (*see* citriodorum).
cordatum, 3′, spr., pur., wh. (*syns.* betulæfolium and cordifolium).
cordifolium (*see* cordatum).
corymbosum (*see* tomentosum).
Cotyledonis, 1′, Je., wh.
crassifolium (*see* crispum).
echinatum, 1½′, Je., wh., red.
glaucum, 3′, Jy., wh., red.
graveolens, 3′, My., pur.
hirsutum (*see* atrum).
leucanthum (*see* zonale var.).
melananthum (*see* atrum).
peltatum, 2′, Jy., pur.
Schottii, 1½′, sum., crim., blk.
stenopetalum (*see* zonale var.).
tetragonum, 2′, Jy., pk.
triste, 1½′, Jy., grn., yel.; vars. filipendulifolium and millefoliatum, lvs. much divided.

PELARGONIUM, IVY-LEAVED.

Description.—As trailing plants, for pot culture and summer bedding, single-flowered Ivy-leaved Pelargoniums, varieties of peltatum, have long been grown in gardens, but the real popularity of the plant dates from the introduction of the first double-flowered form. Since then the history of the Ivy-leaved Pelargonium has been one of progress. Many beautiful varieties have appeared, nearly all the delicate colours of the Zonals are represented in the section, and, while the trailing habit of the plant is preserved, the flowers are highly suitable for cutting.

Propagation.—By cuttings; seeds in the case of new varieties. The cuttings are made and inserted in the same way as with Zonal "Geraniums," and root freely under cool conditions from spring to autumn.

Soil and Potting.—Good loam three parts, leaf mould one part, decayed manure half a part, and sufficient sand to make the whole porous. Firm potting is conducive to sturdy, short-jointed growths and abundance of flowers.

Other Cultural Points.—Plants raised from cuttings in the autumn or early spring and grown in pots are suitable for planting in boxes at the end of May. Some varieties make excellent pot plants, and require little support beyond one neat stake in the centre, to which the shoots are loosely tied. Free-growing varieties make effective specimens if a large plant is placed in an 8″ or 10″ pot, and the growths are trained over a pyramidal wire framework. A substitute for the latter may be obtained by inserting five tall stakes round the side of the pot, drawing them together at the top and securely tying them. The stakes are soon hidden by the foliage if the growing shoots are coiled round them. Ivy-leaved Pelargoniums are ideal plants for hanging baskets in conservatories, corridors, and windows, either alone or in conjunction with other subjects. The receptacles should be lined with green moss and filled with soil. Arrange the plants round the sides and allow the growths to hang over. The baskets should be suspended in a shady part of a greenhouse for a few days till the plants are established, after which they may be exposed to sunshine. For furnishing vases in the garden during summer these plants are valuable, and they are also useful for bedding. Under all conditions the flowers should be picked off as they fade, and it is better to feed the plants with weak liquid manure than to grow them in very rich soil.

Selection of Double Varieties:—

Achievement, salmon pk.
Beauty of Castle Hill, ro.
Beauty of Jersey, sc.
Ernest Bergmann, crim. sc.
Jacques Caillot, vio. pur.
Jeanne d'Arc, wh., lavender.
La France, lil.
Lamartine, or. sc.
Queen of Roses, rosy magenta.
Robert Owen, rosy red.
Ryecroft Surprise, salmon pk.
Souvenir de Charles Turner, deep pk.

Double Varieties, well adapted for Trailing :—

Comtesse Horace de Choiseul, ro.
Isadore Féral, ro.
La Florifère, ro. pk.
Madame Crousse, pk.

Single Varieties :—

La France, light ro.
Masterpiece, magenta crim.
Multiflore, pk.
Victoria, ro. pk.

PELARGONIUM, ZONAL.

For garden purposes it has been thought desirable to deal with this popular section under GERANIUM in the present work. (*See* GERANIUM, ZONAL.)

PELARGONIUMS, SHOW, FANCY, DECORATIVE, and REGAL.

Description.—These are quite distinct in leaf, growth, and flower (*ord.* Geraniaceæ). The stems and leaves are harsh to the touch, and the latter are green, never showing variegation as found in many Zonal varieties. The inflorescence shows little variation in either group, but in those under consideration the largest flowers are produced, and these are somewhat funnel shaped, though in the case of some Fancy forms the petals have become almost as flat as those of a Zonal variety. The group is attractive, and useful for conservatory decoration, from the broad range of striking combinations of colour.

Propagation.—By cuttings. After flowering the plants need full exposure to air and sun, to ripen the growth thoroughly; at the same time the water supply is reduced and eventually withheld as the leaves fall. The next operation is pruning back the shoots. From these prunings cuttings are made, allowing two or three well-developed eyes or buds to each. Several cuttings may be placed in a 5″ pot if kept near the side. Give ample drainage. Use light sandy soil and press it firmly about the base of the cuttings. If inserted in August the cuttings root readily in a cold frame, kept close, provided very little water is given until new growth is made. Later cuttings should be placed in gentle heat until ready to be potted separately.

History.—Neither how nor when this race originated seems to be certainly known, but it is most probable that acerifolium, cucullatum, and grandiflorum were used as parents. In the hands of the old florists great advances were made by intercrossing and selection, and eventually the finer forms became classed as Show varieties; the vigorous, free-flowering forms, with flowers falling short of the florists' ideal of form and beauty, as Decorative varieties; and the dwarfer, floriferous, compact growers as Fancy or Ladies' varieties. Formerly the Show and Fancy sorts were grown to enormous size for exhibition, but latterly they have fallen from popularity, while the Decorative varieties, together with what are known as Regal varieties, have taken their places. The latter usually have more brilliant colours, one or more extra petals per flower, and crimped or waved segments.

Soil and Potting.—Good, turfy loam, roughly broken up, three parts, dried cow manure one part, with sufficient coarse sand to render the whole porous. Firm potting is essential.

Other Cultural Points.—From the time the rooted cuttings are potted, right on to early spring, watering must be done with great care. It is easy to give too large a supply during the dull winter months. Water must never be allowed to stand on the leaves. Stage the plants close to the glass in an airy greenhouse where the temperature is not allowed to fall below 40° at night and during severe weather. Show varieties should be put in their flowering pots during December, but Fancy varieties should receive a final shift early in October or in November, unless late plants are required, when potting may be done in March. Staking and tying are matters to be attended to as needed. Cut-back specimens readily respond to a little warmth and an occasional syringing, but as soon as growth commences their roots should be shaken free from the old soil, trimmed, and repotted into small pots. Subsequent treatment is much the same as for young stock. Frequent vaporisation or fumigation is required.

Selections of Varieties :—

Show Varieties :—

Achievement, or. sc., wh.
Amethyst, bluish pur., maroon.
Bluebeard, rosy heliotrope, red.
Cornet, or. sc., maroon.
Lady West Ridgway, wh., ruby.
Marguerite, wh., maroon.
Mary Hoyle, rosy or., wh., vermilion.
Mrs. Coombes, wh., car.
Mrs. W. Wright, blush, crim.
Royal Ascot, or. sc., dark red.
Sunbeam, crim. sc., maroon.
Sultana, red, wh., chocolate.

Fancy Varieties :—

Atlantic, crim., pur.
Bridesmaid, lavender wh.
Cherry Ripe, rosy crim., wh.
Delicatum, wh., pale ro.
Ellen Beck, lil., car.
Lord of the Isles, rosy pur., wh.
Mrs. Langtry, wh., lil., ro.
Penelope, ro., wh.
Princess Helena, rosy pur.
Princess Teck, wh., car.
Roi des Fantaisies, rosy crim., wh.
Sims Reeves, pur., maroon.

Decorative Varieties :—

Buffalo Bill, lil., ruby.
Digby Grand, wh., car., crim.
Duchess of Bedford, wh., rosy car.
Duchess of Edinburgh, wh., ruby crim.
Duchess of Portland, rosy peach, salmon.
Edward Perkins, or. sc., maroon.
Eucharis, pure wh., long stalks; fine for cutting.
Gold Mine, or., ro.
H. J. Jones, rosy red, wh., crim.
Kingston Beauty, wh., pur.
Ladas, pk., maroon.
Mrs. George Gordon, wh., flushed salmon.
Mrs. H. M. Stanley, rosy mauve, crim. lake.
Princess Victoria, blush pk., semi-double.
Queen of Whites, wh., semi-double.
Triomphe de St. Mandé Improved, magenta, crim.
Volonté Nationale, rosy car., wh.
Volonté Nationale album, wh.

Regal Varieties :—

Albert Victor, ro., wh.
Bush Hill Beauty, wh., car., ro.
Capt. Raikes Improved, crim., cerise, wh.
Dr. Masters, crim. sc., maroon.
Duchess of Fife, rosy crim., wh.
Duke of Albany, crim., blush.
Duke of York, rosy crim., wh., maroon.
Emmanuel Lias, ro., wh., shaded crim.
La Belle de Tours, wh., ro.
Larbert Gem, rosy crim.
Mdme. Thibaut, ro., wh.
Mdme. Thibaut album, wh.
Persimmon, crim., dark maroon.
President Harrison, car. ro., wh., chestnut.
Prince Teck, sc., pur., maroon.
Prince of Wales, vermilion crim.
Princess Beatrice, blush, crim.
Queen Victoria, vermilion, wh.. maroon.

PELECYPHORA. (Hatchet Cactus.)

There is one species in this genus (*ord.* Cacteæ) which is allied to Mammillaria. Propagation, by seeds, also by offsets when they can be obtained. (*See* Cactus for particulars of other cultural matters.)

Only Species and Varieties :—

aselliformis, stem short, scaly, Je., grh., wh. or ro., 1½″ across. — concolor, ro. pur.
— cristata, crested.
— pectinatus, scales larger.

PELEXIA.

Stove terrestrial Orchids (*ord.* Orchidaceæ), not very ornamental. They may be treated like Goodyeras.

Pellæa hastata.

Principal Species :—

adnata, 1′ to 3′, grn., lip wh. (*syn.* spiranthoides).
maculata, grn., tipped pk., lvs. grn., blotched grey above, pur. underneath.
roseo-alba, 1′, wh., lvs. grn., spotted wh. (*syn.* Travassosii).

Other Species :—

olivacea, grn., petals and lip wh., lvs. banded wh.
saccata, 6″, grn., lip wh.
setacea, 1′ to 2′, grn. (*syn.* Neottia calcarata).
wendlandiana, 2′, grn., br., lip wh.

PELLÆA. (Cliff Brake Fern.)

Description.—An important genus of handsome Ferns (*ord.* Filices), all easily grown. Most of them flourish in a greenhouse temperature. Many have a habit similar to the Cheilanthes. The fronds are pendent or sub-pendent, and show to advantage when the plants are grown in baskets. Falcata, hastata, and rotundifolia are very nearly hardy. Hastata is good for the dwelling-room.

Propagation.—By spores, which germinate freely in a warm greenhouse. Also by division where the plants have rhizomes.

Soil.—Two parts of peat and one part each of loam and mortar rubbish. None of the plants require much soil.

Other Cultural Points.—Pellæas require moisture all the year round, but the foliage should not be wetted. They like to be kept close up to the glass, but go yellow if exposed to direct sunlight. Basket culture gives the exposure they enjoy. The chief insect enemy is thrips, for which fumigate. Forms with leathery fronds may be sponged.

Principal Species and Varieties :—

[Note.—The dimensions apply to the fronds, and do not include the stipe or stalk, which is often about the same length.]

adiantoides, 1½′ to 2′ long, bipinnate, grh., grn. (*syns.* Platyloma adiantoides, and Pteris adiantifolia, P. adiantoides, and P. latifolia).
andromedæfolia, 6″ to 12″ long, tri or quadripinnate, rigid, grh.
atropurpurea, 4″ to 12″ long, 2″ to 6″ broad, pinnate, deltoid, grh. or hlf-hdy.
brachyptera, 4″ to 6″ long, spear shaped, bipinnate, grh.
Bridgesii, 4″ to 6″ long, 1″ broad, pinnate, grh.
cordata, 12″ long, 4″ to 6″ broad, spear shaped, leathery, grh.
— flexuosa, 6″ to 24″ long, bi or tripinnate, very leathery, grh., one of best (*syn.* Platyloma flexuosa of gardens).
— sagittata, 1½′ to 2′, bipinnate, grh. (*syns.* Allosorus sagittatus and Pteris sagittata).
falcata, 6″ to 18″ long, 1″ to 2″ broad, spear shaped, grh.
geraniæfolia, 2″ to 4″ each way, deltoid, erect, papery, st.
hastata, 1′ to 2′ long, bi or tripinnate, leathery, grh., plant of upright habit (*syn.* adiantifolia of gardens, *see* figure).
Ornithopus, 4″ to 6″ long, triangular, bipinnate, rigid and leathery, grh. Bird's-foot Fern.
rotundifolia, 6″ to 12″ long, 1″ to 1½″ broad, pinnate, very leathery, grh.
ternifolia, 6″ to 12″ long, 1″ to 1½″ broad, pendulous, leathery, st.

Other Species and Varieties :—

adiantifolia of gardens (*see* hastata).
alabamensis, 4″ to 8″ long, 1¼″ to 2″ broad, bi or tripinnatifid, grh. (*syns.* Allosorus and Cheilanthes alabamensis).
angustifolia, 6″ to 12″ long, 3″ to 6″ broad, quadripinnatifid, leathery, st. (*syn.* decomposita).
— cuneata, 6″ to 12″ long, 3″ to 6″ broad, quadripinnatifid, st.
bella, 5″ to 6″ long, bipinnate, grh.
Breweri, 3″ to 9″ long, 1″ to 1½″ broad, grh.
Brownii (*see* paradoxa).
calomelanos, 4″ to 8″ long, 3″ to 6″ broad, bi or tripinnate, grh. (*syns.* Pteris hastata and Allosorus calomelanos).
consobrina, 6″ to 12″ long, 4″ to 9″ broad, tri or quadripinnatifid, grh.
crispa (*see* Cryptogramme crispa).
decomposita of Hooker (*see* angustifolia).
densa, 2″ to 3″ long, 1″ to 1½″ broad, tripinnate, grh.
flexuosa (*see* cordata var.).
glauca, 3″ to 4″ each way, deltoid, grh. (*syn.* Pteris glauca).
gracilis, 2″ to 4″ long, 1″ to 2″ broad, bi or tripinnatifid, grh. (*syns.* Stelleri, and Pteris gracilis and P. Stelleri).
intramarginalis, 6″ to 12″ long, 2″ to 4″ broad, bipinnatifid, st.
— serratifolia, pinnules toothed (*syn.* Pteris fallax).
involuta, 3″ to 4″ long, 1″ to 1½″ broad, tripinnatifid, grh.
longimucronata (*see* mucronata).
mucronata, 3″ to 6″ long, 1″ to 3″ broad, deltoid, bipinnate, nearly hdy. (*syns.* longimucronata and wrightiana).
paradoxa, 6″ to 9″ long, 4″ to 6″ broad, pinnate, grh. (*syn.* Brownii).

Pelican Flower (*see Aristolochia gigas*).

PELLIONIA.

Stove herbs (*ord.* Urticaceæ), occasionally sub-shrubby, with variable leaves. Propagation, by cuttings and division. Soil, rich, sandy loam. Plenty of atmospheric and root moisture is required.

Principal Species and Varieties :—

daveauana, Aug., flowers grn., lvs. metallic grn., banded bright grn., marked with br. or bronze; a pretty cl. (*syn.* Begonia daveauana).
— viridis, lvs. grn., blotched wh.
pulchra, lvs. dark grn. above, pur. below, stems very fleshy; cl.

PELTANDRA.

Hardy perennial herbs (*ord.* Aroideæ) with slender rhizomes and large leaves. Propagation, by division in spring. Soil, boggy ground; or will grow in shallow water.

Principal Species :—

virginica, 1′, lvs. large and pointed. Arrow Arum.

PELTARIA.

Tall, glabrous perennial herbs (*ord.* Cruciferæ) with white flowers. Propagated by seeds or by division, in spring. Light soil will do.

Principal Species :—

alliacea, 1′, Je., hdy., wh. The whole plant is Garlic scented.

PELTOPHORUM.

Unarmed stove trees (*ord.* Leguminosæ) with yellow flowers and handsome bipinnate leaves. They may be treated like Cæsalpinias.

Principal Species :—

Linnæi, or. yel. (*syn.* Cæsalpinia brasiliensis). Brazilletto-wood.

Pellitory (*see Parietaria officinalis*).

PELTOSTIGMA (*syn.* PACHYSTIGMA).

An obscure genus (*ord.* Rutaceæ) of one stove evergreen tree. Propagation, by cuttings. Soil, sandy loam and fibrous peat.

Only Species :—

ptelioides, Feb., st. ev., wh., fragrant

PENÆA.

An obscure genus (*ord.* Penæaceæ) of dwarf, evergreen, densely leaved greenhouse shrubs, with yellow or red flowers. Propagation, by cuttings. Soil, sandy peat.

Principal Species :—

mucronata, 2′, Je., yel. or pur.
myrtoides, 2′, Je., red.

Photo: Cassell & Company, Ltd.

PENNISETUM LONGISTYLUM.

PENNISETUM.

Tropical and sub-tropical Grasses (*ord.* Gramineæ). Several are very ornamental, the long awns or bristles of the flowers having a peculiarly graceful appearance. Propagation, the annuals by seeds, the perennials by division. Soil, loam and leaf mould, with sand, for the indoor species. Longistylum is one of the most distinct and beautiful of Grasses, and is worthy of more extended cultivation.

Principal Species and Varieties :—

latifolium, 9′ to 10′, hlf-hdy. per. (*syn.* Gymnothrix latifolia).
longistylum, 1′ to 1½′, Aug., hlf-hdy. ann., pur. (*see* figure).
— violaceum, awns vio.
orientale, 2′ to 6′, hdy. ann. (*syn.* ruppellianum).

Other Species :—

cenchroides, 1′ to 2′, grh. ann.
compressum, 2′ to 3′, grh. ann.
giganteum, 5′ to 6′, st.
setosum, 3′ to 4′, st. or grh. per.

Penny Grass (*see Rhinanthus Crista-galli*).

PENNYROYAL.

The Pennyroyal (Mentha Pulegium), a garden herb, is occasionally asked for, and a few roots of it should be included in the herb border. A native of Britain, it is perfectly hardy. Propagation, by division in winter or spring. The smallest pieces will root. Plant in rows 12″ apart, allowing 6″ between the plants in the rows. A north or even a north-east border will suit it well. Soil, moist, low-lying, sandy loam. (*See also* MENTHA.)

PENTACHÆTA.

Greenhouse or hardy annual herbs (*ord.* Compositæ). Propagation, by seed sown in spring in a warm border. Light, rich soil.

Principal Species :—

bellidiflora, 2″ to 3″, sum., hdy., yel., heads 1″ across (*syn.* aurea of Asa Gray).

PENTADESMA. (BUTTER and TALLOW TREE.)

A tall-growing stove tree (*ord.* Guttiferæ). Propagation, by ripened cuttings in sand, in a close frame, in strong bottom heat, removing none of the leaves. Soil, loam and peat in equal ratio, with sand. The popular name is due to the thick, yellow, greasy juice that exudes from the tree when cut.

Only Species :—

butyracea, flowers red, large, and showy; fruit an edible berry.

PENTAGONIA.

Stove shrubs (*ord.* Rubiaceæ) with thick branches and yellow, red, or green flowers. Wendlandii may be treated like the Cinchonas, which *see*.

Principal Species :—

Wendlandii, 2′, Jy., yel.

PENTAPERA.

Pentapera sicula (*syn.* Erica sicula, *ord.* Ericaceæ) is a half-hardy evergreen Heath-like shrub, with pretty pink or white flowers, and easily grown. Increase is by cuttings. Soil, peat.

PENTAPETES.

One species, a showy stove annual (*ord.* Sterculiaceæ). Propagated by seeds and cuttings of the half-ripe shoots. Soil, sandy loam two parts, leaf mould one part, and sand.

Only Species :—

phœnicea, 2′ to 3′, Jy., st., sc.

suberifolia (now Pterospermum suberifolium).

PENTAPTERYGIUM.

Epiphytal shrubs (*ord.* Vacciniaceæ). Propagation, by cuttings, in sand, under a bell-glass, in heat. Soil, fibrous peat, with sand. Baskets as well as pots may be utilised.

Principal Species :—

flavum, 1′ to 8′, grh., yel., tipped red, 1″ long, in pendulous racemes.

rugosum, 1′ to 8′, grh., wh., marbled reddish pur., 1″ long, pendulous (*syn.* Vaccinium rugosum).

serpens, 2′ to 10′, grh., bright red, flowers numerous, rootstock tuberous; the best.

Pennywort or Pennyleaf (*see Cotyledon Umbilicus, Hydrocotyle vulgaris, Linaria Cymbalaria and Sibthorpia europæa*).

Pentaceros (*see Buettneria*).

Pentalophos (*see Lithospermum*).

Pentaphragma (*see Aranjia*).

Pentaphyllon (*see Trifolium*).

PENTARHAPHIA (*syn.* CONRADIA).

Stove branching herbs or sub-shrubs (*ord.* Gesneraceæ), some of which have very showy flowers. They like the same cultural treatment as the Gesneras, which *see*.

Principal Species :—

floribunda, dwarf, sum., sub-shr., red, numerous.

libanensis, 4″, Je., sub-shr., crim. (*syns.* Gesnera libanensis of *Botanical Magazine* 4380, and Rhytidophyllum floribundum).

longiflora, dwarf, sum., aut., shr., sc. (*syn.* Conradia ventricosa).

Other Species :—

Craniolaria, 3′ to 4′, sum., grn., yel. (*syn.* Craniolaria fruticosa).

cubensis, 2′, sum., sc.

neglecta, 4″, Sep., sub-shr.

PENTAS (*syn.* ORTHOSTEMMA and VIGNALDIA).

Stove herbs and sub-shrubs (*ord.* Rubiaceæ). Few species have been introduced. Propagation, by cuttings of young shoots in sandy soil in a close propagating case. Soil, loam two parts, leaf mould one part, with sand. The rammer should not be used, and rather small pots give the best results. The young plants need to be pinched. Nothing is brighter in the stove in the dull months than carnea and its beautiful varieties kermesina and quartiniana.

Principal Species and Varieties :—

carnea, 1½′, aut., win., spr., sub-shr., flesh pk.

— kermesina, ro., tinted vio.

— quartiniana, pk.; more floriferous than the species.

Other Species :—

parviflora, 2′, Ap., sub-shr., sc.

PENTHORUM.

Hardy, erect, perennial herbs (*ord.* Crassulaceæ), allied to the Sempervivums, like which they may be treated.

Principal Species :—

sedoides, Jy., Sep., greenish yel., likes moist places.

PENTSTEMON. (BEARD TONGUE.)

Description.—A genus of hardy or half-hardy perennials (*ord.* Scrophularineæ) of herbaceous or sub-shrubby habit, many of the species being fine border or rockery plants. The hybrid Penstemons, derived principally from Cobœa and Hartwegii, are very handsome.

Propagation.—By seeds sown in spring in pans, pots, or boxes, or in frames; the varieties by cuttings in early autumn in frames, using sturdy side growths. These are wintered in a cold frame, and planted in spring. The sub-shrubby species are also propagated by cuttings or division. Nearly all are best propagated annually.

Soil.—For the varieties, a rich, well-manured soil, with plenty of water while growing. Most Alpine species like a peaty soil among stones.

Principal Species and Varieties :—

azureus, 1′, Aug., hdy., bl.

— jaffrayanus, hdy.

barbatus, 3′, Jy., hdy., sc. (*syn.* Chelone barbata).

— Torreyi, sc. (*syn.* Torreyi).

Cobœa, 1′ Aug., hlf-hdy., pur. to wh.

— purpurea, fine var.

confertus, 9″ to 18″, Jy., hdy., yel.

— cœruleo-purpureus, hdy., bl., pur. (*syn.* procerus).

glaber, 1′, Aug., hdy., pur. or bl. (*syns.* Gordoni and erianthera).

— cyananthus, 2½′, Aug., hdy., pur., bl.

— speciosus, 2′, Aug., hlf-hdy., bl. (*syn.* speciosus).
Hartwegii, 2′, Jy.to Aug., hdy., sc. (*syn.* gentianoides of Lindley).

Other Species :—

breviflorus, 3′ to 5′, Sep., hlf-hdy., pk. or yel.
cœruleus, 6″, Jy., hdy., bl. (*syn.* Chelone cœrulea).
campanulatus, 1½′, Je., hlf-hdy., pk., bl. (*syns.* angustifolius, atropurpureus, pulchellus, and Chelone atropurpurea and C. angustifolia).
cordifolius, 1′, Je., hlf-hdy. sub-shr., sc.
diffusus, 1½′, Sep., hdy., pur.
gentianoides, 3½′, Jy., hlf-hdy., vio.
grandiflorus, 3′, Jy., hlf-hdy., pur.
Hallii, 9″, sum., hdy., lil.
Menziesii, 6″, Je., hdy., pur., lil., red; vars. Lewisii, Scouleri, Newberryi, etc.
humilis, 6″ to 9″, Aug., hdy., lil., pur.
lævigatus, 2′ to 4′, Jy., hlf-hdy., wh., pur.
— Digitalis, 1′, Aug., hlf-hdy., wh.
ovatus, 4′, Jy., hlf-hdy., pur., bl.
Palmeri, 1½′, Jy., hlf-hdy., pale pur.
pubescens, 1′, Aug., hlf-hdy., vio., pur., or wh. (*syns.* hirsutus, mackayanus).
Richardsonii, 1½′, Jy., hdy., vio.
Roezlii, 9″ to 12″, Jy., hdy., pale bl.
secundiflorus, 1′, sum., hlf-hdy., bl.

PEPEROMIA. (Pepper Elder.)

Description.—A large genus (*ord.* Piperaceæ) of annual and perennial herbaceous plants. All have fleshy leaves, many of them being very desirable ornamental foliage plants. Resedæflora is the only one having flowers at all showy. As basket plants, for which their closely trailing habit fits them, Peperomias are most useful. They may also be employed for clothing rustic tree stumps or the back wall of the stove.

Propagation.—By cuttings, which will root at almost any season, in bottom heat. They must not be put in a close case or they will damp off. Occasionally by seeds.

Soil.—Fibrous peat and loam in equal parts, with one-sixth sand.

Other Cultural Points.—The plants do not need so much water as most stove plants, and they like rather more shade, but the syringe should be kept regularly at work.

Principal Species :—

[Note.—All are stove perennials except where otherwise stated. The colour descriptions given apply to the leaves.]

Peperomia arifolia.

maculosa, fleshy, grn., petioles pur.
marmorata, fleshy, grn., wh., marbled, broad; one of the best.
metallica, 1′, grn., striped pale grn. above, red veins below.
nummulariæfolia, small, round, grn., stems slender and creeping; a pretty basket plant.
obtusifolia, 1′, grn., margined red, stems red and wrinkled (*syn.* clusiæfolia).
Sandersii, 8″ to 10″, nearly round, grn., wh., habit compact (*syn.* Saundersii).
Verschaffeltii, close to Sandersii.

Other Species and Varieties :—

argyreia, grn., grey lvs.
arifolia, grn., grey, ovate (*see* figure).
Botteri, ovate, grn., stems slender.
brevipes, light grn., br.,

Selection of Best Hybrid Pentstemons :—

Charles Gounod.	Mrs. Bernard Cowan.	Saint-Saëns.
George Horne.	Mrs. Irvine.	Scapin.
Hector Macdonald.	Mrs. Oliver.	Talma.
John Forbes.	Peter Readman.	Wm. Robb.

PENTZIA.

These South African plants (*ord.* Compositæ) are of little garden value. They may be dealt with in the same way as the Tanacetums.

Principal Species :—

crenata, 2½′, My., Aug., hdy., yel. (*syns.* flabelliformis and Tanacetum flabelliforme of *Botanical Magazine* 212).

Pentlandia (*see Urcolina*).

stems slender and thread-like; a pretty basket plant (*syn.* prostrata of gardens).
clusiæfolia (*see* obtusifolia).
eburnea, 12″ to 15″, grn., veined emerald grn., petioles wh., habit tufted.
incana, 1′, sub-shr., fleshy, covered wh. hairs.
inquilina, small, grn., fleshy, round; a pretty trailer.
microphylla, small, oblong, grn., trailer.
obliqua, fleshy, grn. (*syn.* Piper acuminatum).
peltæformis, dark grn., banded grey.
prostrata of gardens (*see* brevipes).
pubifolia, small, ovate, fleshy, grn., banded grey; baskets.
resedæflora, dark grn., flowers wh., fragrant.
velutina, dark grn., banded grey, stems red.

PERAPHYLLUM.

A hardy, branching shrub (*ord.* Rosaceæ). It was, until recently, included with the Amelanchiers, and succeeds under the same treatment.

Only Species :—

ramosissimum, 2′ to 6′, My., hdy., wh., ro., ¾″ across, bushy.

PERENNIAL.

Plants which live and flower each year for several years—that is, upwards of two years—are termed perennials. Strictly speaking, this includes all shrubs and trees as well as herbaceous plants, but the gardener has narrowed down the meaning, and when he speaks of perennials he means hardy herbaceous perennials. (*See* HERBACEOUS PLANTS.)

PERESKIA. (AMERICAN or BARBADOES GOOSEBERRY.)

Prickly stove trees and shrubs (*ord.* Cacteæ), some of which have showy flowers. Bleo and aculeata are chiefly grown to furnish stocks whereon to graft other Cacti, notably Epiphyllums — aculeata is the more extensively used of the two. Propagation, by cuttings inserted in very sandy soil, and kept in a dry heat. Soil, sandy loam, with crushed bricks or potsherds. Firm potting.

Principal Species and Varieties :—

aculeata, 5′ to 7′, Oct., shr., wh., fruit globose. Rubens, lanceolata, and rotunda are vars. American or Barbadoes Gooseberry.
Bleo, 8′ to 10′, Oct., Jan., shr., red, stamens red, wh.
grandifolia, 6′, Aug., wh., very spiny, spines blk., 3″ long (*syn.* grandiflora).
zinniæflora, resembles Bleo, but has rosy red flowers 2″ across.

Other Species :—

lychnidiflora, yel., Rose-like.
Pititache, 3′, Sep., shr., wh.
Pœppigii, lvs. grn., spines wh., strong.
portulacæfolia, 20′ to 30′, pur., fruit round, wh. fleshed, black seeded.
spathulata, lvs. very thick, red.
subulata, stem very fleshy.

PEREZIA (*syn.* CLARIONEA).

Greenhouse, half-hardy, and hardy herbs (*ord.* Compositæ), few of which are known to cultivators. Propagation, the perennials by cuttings and root division, and the annuals by seed. Soil, loam two parts, leaf mould one part, and sand for the pot plants, and ordinary garden soil for the hardy species.

Principal Species :—

sonchifolia, hlf-hdy. ann., wh.; like a small double Camellia.

Other Species :—

multiflora, hlf-hdy. ann., bl. (*syn.* Homoianthus multiflorus).
viscosa, 1½′, Je., hdy. per., pur., red (*syn.* Homoianthus viscosus).

PERGOLA.

An extended series of arches; taken together, a long arch, of which the permanent portion is represented by the framework. The mission of the pergola is twofold, first to supply cosy nooks and arbours or a partially protected promenade, and secondly to afford support to various climbers which form, in summer, a more or less complete leafy canopy.

When the foundations for the uprights are composed of piers of brick or dressed stone, and the posts themselves of prepared Oak or iron, a pergola will cost a good deal of money, but where the simpler plan of using undressed Oak or Fir, the ends being creosoted before being fixed in the ground, is adopted, the cost is greatly reduced. Also the appearance of the structure as a whole is considerably enhanced. The dimensions of the pergola will depend upon the desires of the owner and the size of the garden, but it should not be less than 7′ in width or it will not be effective. The cross beams at the top must at least allow of visitors walking underneath without stooping. Thus a height of 6′ is the minimum, 7′ will be better, and 8′, 10′, or 12′ is not too much, provided the other dimensions are in proportion. Any of the climbers recommended under ARBOURS may be utilised. (*See also* CLIMBERS.)

PERGULARIA.

Stove evergreen climbers (*ord.* Asclepiadeæ) which should be grown like Stephanotis. The plants are rare in cultivation, but odoratissima is worthy of attention.

Principal Species :—

odoratissima, Je., grn., yel.; very fragrant. West Coast Creeper.

Other Species :—

minor, My., Aug., or., yel.; fragrant.
sanguinolenta, Jy., grn., yel.; juice of plant blood red (correctly a Cryptolepis).

PERICOME.

Half-hardy, shrubby perennials (*ord.* Compositæ), of which only two species are recognised. Propagation, by seeds and division. Any ordinary garden soil.

Principal Species :—

caudata, 3′ to 4′, hdy., sum., golden yel. The whole plant is strongly scented.

PERIDERMIUM.

A small but rather destructive group of Fungi which are parasitic upon the Coniferæ. Its members belong to the section known as Red Rusts, in which the mycelium part (vegetative) runs in the tissues of the leaves and branches of the host, and produces its fruits externally in the

Pepinia (*see Pitcairnia*).
Pepper (*see Piper*).
Pepper, Chinese (*see Xanthoxylum*).
Pepper Vine (*see Vitis arborea*).
Peppermint (*see Mentha piperita*).
Pepperwort (*see Lepidium*).
Perdicium (*in part, see Trixis*).
Pereiria (*see Coscinium*).

form of little cysts (peridia), which contain the minute, orange coloured spores. Elatinum (*syn.* Æcidium elatinum) causes swellings upon the bark of the Silver Fir (Abies pectinata); Pini and its variety acicolum do the same for the Scotch Fir (Pinus sylvestris) and the Austrian Fir (P. Laricio austriaca). The so-called witch besoms upon these trees are caused by the fungus. The remedy is the excision of the diseased branches as soon as the swellings appear. Badly infested trees should be burnt, to prevent the spread of the disease. P. Pini usually restricts its attentions to trees under twenty years of age. Recent researches prove that this fungus is a stage in the life history of Coleosporium Senecionis, which preys upon Groundsels and Ragworts, therefore such weeds should be destroyed.

PERILLA (*syn.* DENTIDIA).

A genus of half-hardy annuals (*ord.* Labiatæ) used for bedding, for which their fine, dark foliage is very useful. Propagated by seeds, sown in gentle heat in the middle of March, the seedlings being pricked off and hardened before being planted out at the end of May. Soil, light and rich. The flowers are of no value and should be pinched off.

Principal Species and Varieties :—

arguta, 1′ to 3′, Jy., wh.
nankinensis, a popular garden form, referred to various other forms by different botanical authorities.
ocimoides, 1′ to 3′, Jy., wh. (*syn.* heteromorpha).
— crispa, dark pur.
— rosea, variegated with pk., red, wh., and pale grn.

PERILOMIA.

Sub-scandent, leafy shrubs (*ord.* Labiatæ) from South America. Propagation, by cuttings of the young shoots in sand, in a greenhouse. Soil, sandy peat. Firm potting.

Principal Species :—

scutellarioides, 3′, Aug., hlf-hdy. ev. shr., sc. (*syn.* ocimoides).

PERIPLOCA.

Shrubs (*ord.* Asclepiadeæ), principally hardy and of twining habit. Græca is the best, and is appreciated for the rapidity with which it covers trellises, walls, or arbours. Propagated by cuttings, under a hand-light or bell-glass in summer or autumn, or by layers. Common soil. Campelepis is now included with Periploca.

Principal Species :—

græca, Jy., hdy. cl., br., grn. (*syn.* maculata).

PERISTERIA. (FLOWER OF THE HOLY SPIRIT. DOVE FLOWER.)

A small genus of handsome Orchids (*ord.* Orchidaceæ) with stout, fleshy pseudo-bulbs and broad leaves. The flowers are large, very fleshy and fragrant. Propagation, by division and by imported pieces. Soil, fibrous loam and peat or leaf mould, in equal parts, with sand. Plenty of water is needed whilst growth is in progress. Water should only be applied sparingly when the plants are at rest. Although commonly grown in the stove, Peristerias may be well served in an intermediate house, but they must have plenty of light.

Periphragmos (*see Cantua*).

Principal Species :—

[NOTE.—s. = sepals, p. = petals, l. = lip.

cerina, bulbs 3″ high, sum., yel.; Juniper scented.
elata, bulbs 6″ high, lvs. 2′ to 3½′ long, sum., wh., l. spotted pur., fragrant, 3″ across. Dove Orchid.
Lindenii, Feb., s. and p. grn., pur., l. spotted blackish pur. on a light ground.
pendula, bulbs 4″ to 6″ high, lvs. 12″ to 15″ long, scapes pendent, aut., yel., wh., dotted pur., fragrant (*syn.* maculata).

Other Species and Varieties :—

aspersa, bulbs 3″ to 5″ high, sum. and various, s. and p. yel., br., and pur. red, l. darker.
Barkeri (*see* Acineta Barkeri).
Ephippium, close to pendula.
guttata, 6″, yel., red; curious.
Humboldtii (*see* Acineta Humboldtii).
læta, yel., resembles cerina.
longiscapa (*see* Lacæna bicolor).
maculata (*see* pendula).
rossiana, close to pendula.
selligera, rather deeper yel. than pendula.
stapelioides (now Zygopetalum stapelioides).

PERISTROPHE.

One species, speciosa (*ord.* Acanthaceæ), is fairly common. This handsome plant is an easily grown, free-flowering, and showy, warm greenhouse, winter-flowering subject. Propagation, by cuttings rooted in heat in spring. Soil, two parts loam, one part old Mushroom bed manure, and one part leaf mould, with sand.

Principal Species :—

speciosa, 1′ to 3′, win. and early spr., st. or warm grh., car. pur. (*syn.* Justicia speciosa). A most desirable plant.

Other Species :—

lanceolaria, 1′ to 3′, win., pale pur., wh.

PERNETTYA.

Desirable hardy or half-hardy evergreen shrubs (*ord.* Ericaceæ), with small flowers succeeded by prettily coloured berries. The most ornamental species is mucronata, of which there are many seedling forms, with berries ranging from white to nearly black. The Pernettyas make useful pot plants. Propagation, by seeds in spring and by layers. Moist peat and loam form a suitable soil.

Principal Species and Varieties :—

ciliaris, 3′, Je., hdy., wh.
floribunda, hdy., wh., berries crim., probably a form of mucronata.
furens, Mch., hlf-hdy., wh. (correctly Arbutus furiens).
mucronata, 6′, My., hdy., wh.; many vars., coccinea, carnea, lilacina, macrocarpa, nigra major, sanguinea, and speciosa are very pretty (*syns.* angustifolia, Cummingii Drummondii, ovalifolia, speciosa, and Arbutus mucronata).
phillyreæfolia, 1′, hlf-hdy., wh. (*syn.* Arbutus phillyreæfolia).

PERONEA.

A genus of mischievous insects. Comariana (*syns.* comparana, proteana, and potentillana) does damage to Strawberries. Its popular name is Strawberry-Leaf Button Moth. The moth, which appears towards the end of June, is ¾″ in spread of the forewings, which are ochreous, with a dark brown, triangular blotch. Probably there is an autumn brood as well. The larvæ eat the flowers and leaves. Year old plants are never attacked,

Peritoma (*see Cleome*).
Periwinkle (*see Vinca*).
Peronia (*see Thalia*).

two year old plants seldom, but older ones are the usual prey. The removal and burning of the top 2″ or 3″ of soil is to be recommended, also the frequent planting of beds.

Variegana attacks the leaves of Roses. The larvæ should be sought for and killed, and the bushes syringed with Quassia chip solution. (*See* INSECTICIDES.)

PERONOSPORA.

A large genus of parasitic, microscopic Fungi. They belong to the group of White Moulds, which is again included amongst the Mildews. Until recent years the fungus causing the Potato disease was accounted a Peronospora, but it is now referred to the allied genus Phytophthora, which *see*.

The mycelium (vegetative portion) of these Fungi runs internally through all the parts of the hosts, from roots and tubers to leaves and seeds, making free with the nutriment the cells contain. Their course is afterwards marked by softness and putridity of the tissues.

Methods of propagation are as follow. When the fruiting stage is reached, numbers of arms (conidiophores) are produced at right angles to the epidermal tissue of the host, and externally. These branches bear a number of fruits (conidia). The first stage in the germination of these conidia is that each one divides into a number of cells (usually five or six), each containing a zoospore. These zoospores are motile, being furnished with two hair-like appendages (cilia), by which they swim or creep. The zoospore, on germinating, gives rise to new mycelia. This is the summer stage of reproduction. Conidia and zoospores are very sensitive to cold, and towards winter a sexual process gives rise to an egg, or resting spore (oospore), which, with its thicker cell wall, can resist cold, germinating in the spring.

Remedies.—It is necessary to catch the spores whilst on the outside—in other words, prevention rather than cure. Suggested items are :—

1. Spraying with Bordeaux Mixture, potassium sulphide solution, or ammoniacal solution of copper sulphate (*see* FUNGICIDES).
2. The destruction of badly infested plants, roots, and tubers.
3. Thorough cultivation of the soil in autumn.
4. Selection of vigorous seed stocks.
5. An occasional change of stock.
6. To encourage continuous and healthy growth, to avoid checks, and extremes of drought and moisture, which weaken the constitution of the plants, and thus render them liable to infection.

Principal Species :—

arborescens. Attacks Poppies only, causing distortion in the stems.
Cactorum. Causes decay in many species of cultivated Cacti.
effusa. Attacks Spinach and other members of Chenopodiaceæ.
ganglioniformis. Attacks Lettuces and many Compositæ ; is getting rather common.
infestans. Potato disease (*see* Phytophthora infestans).
nivea. Preys upon Carrots, Parsnips, Parsley, and many other Umbellifers.
parasitica. Destructive to Turnips, Cabbages, and the larger Crucifers.
pygmæa. Parasitic upon Anemones.
Schachtii. Destructive to Beetroot. The mycelium lives in the roots through the winter. Seeds are also affected.
schleideniana. Attacks Onions and other Liliaceous plants.
sparsa. Roses. No oospores yet discovered.
Viciæ. Peas and Vetches. One of the most troublesome.
viticola. On Vines. Probably confined to North America and Continental Europe.

PERSEA. (AVOCADO or ALLIGATOR PEAR.)

Many species in this genus (*ord.* Laurineæ) of stove trees or shrubs have large, fleshy, and edible fruits. That of gratissima, the Avocado or Alligator Pear, is about 6″ long, has a buttery flavour, and is a common article of food in the West Indies. Condiments are commonly used with it. Propagation, by matured shoots in sand in bottom heat. Soil, equal parts of fibrous loam and peat, with sand. Firm potting.

Principal Species :—

gratissima, 25′ to 30′, st., flowers grn., ½″ across, fruit Pear shaped.
indica, st., wh., wood hard and prettily grained (*syns.* Tenerriffæ and Laurus indica).

Other Species :—

carolinensis, 20′ to 40′, Jy., st., fruit bl. (*syn.* Laurus carolinensis). Red Bay.

PERSICA (*see* PEACH and PRUNUS).

PERSOONIA (*syns.* LINKIA and PENTADACTYLON).

Greenhouse shrubs or small trees (*ord.* Proteaceæ) with yellow or white flowers. Propagated by cuttings of ripened shoots, in sand, under a bell-glass. Soil, loam and peat in equal parts, with one-fourth sand. Persoonia of Michaux is a synonym of Marshallia ; and Persoonia of Willdenow a synonym of Carapa.

Principal Species :—

ferruginea, 3′, Je., shr., yel.
longifolia, 10′ to 20′, Jy., tree, yel. (*syn.* Drummondii).
rigida, 3′ to 4′, Je., yel. (*syn.* spathulata).

Other Species and Variety :—

hirsuta, 2′ to 3′, Je., shr., yel.
lanceolata, 4′, Je., shr., yel., hairy.
— lævis, a glabrous var.
linearis, 10′ to 20′, Jy., tree, yel. (*syn.* pinifolia and pruinosa).
nutans, 1′, Jy., bushy shr., yel. (*syn.* flexifolia).
saccata, 2′ to 6′, Jy., shr., yel. (*syns.* Fraseri and macrostachya).
Toro, sum., small tree, yel. (*syn.* Tora).

PERYMENIUM.

An obscure genus (*ord.* Compositæ) of no garden value.

PETALACTE (*syn.* PETALOLEPIS).

A single species (*ord.* Compositæ) of greenhouse evergreen sub-shrubs, of little value, but requiring culture similar to the Helichrysums (which *see*).

Only Species :—

coronata, 1′, My., grh., wh.

Persian Sun's Eye (*see Tulipa Oculus-Solis*).
Persimmon (*see Diospyros virginiana*).
Peru Balsam Tree (*see Myroxylon*).
Peruvian Bark (*see Cinchona*).
Peruvian Daffodil (*see Hymenocallis*).
Peruvian Mastic (*see Schinus*).
Peruvian Nasturtium (*see Tropæolum tuberosum*).
Peruvian Swamp Lily (*see Zephyranthes candida*).
Pescatoria (*see Zygopetalum*).
Pesomeria (*see Phaius*).

PETALIDIUM (*syn.* PSEUDO-BARLERIA).

Unarmed stove shrubs (*ord.* Acanthaceæ). Propagation, by cuttings, in spring. Soil, loam two parts, leaf mould one part, and sand one-sixth. Pinch once to obtain well-furnished plants.

Principal Species :—

barlerioides, 3′ to 4′, Je., st. ev., wh.

PETALOSTEMON. (PRAIRIE CLOVER.)

Hardy or half-hardy herbs, perennials for the most part (*ord.* Leguminosæ), allied to Dalea. Propagation, by division of the roots in spring. Any ordinary garden soil.

Principal Species :—

candidus, 1′, Jy., hdy. per., wh., leaflets seven to nine.
violaceus, 1′, Jy., hdy. per., ro. pur., leaflets five.

PETASITES.

Hardy herbs (*ord.* Compositæ), with woolly leaves and more or less fleshy rhizomes. Fragrans, the Winter Heliotrope, and officinalis, the Bog Rhubarb, or Butter Bur, are well-known plants. The former is occasionally employed as a pot plant, for flowering in the cool conservatory in winter. It makes an excellent fringe to rockery bordered fountain basins or miniature waterfalls. Officinalis (*syn.* vulgaris) makes a charming picture, when in full vigour, by the banks of ponds or streams in the wild garden. If a light but rich soil is given the leaves attain to enormous proportions and are quite tropical in appearance. They are of spreading habit, and when unconfined in a garden fragrans often becomes a nuisance. Propagated by division. Any garden soil will do.

Principal Species and Variety :—

fragrans, 6″, Feb., wh., fragrant (*syn.* Tussilago fragrans). Winter Heliotrope.
— giganteus, 6″, the lvs. have edible petioles, like Rhubarb ; in Japan they are used for makeshift umbrellas.
frigidus, 6″, Ap., My., wh. (*syn.* Tussilago frigida).
japonicus, wh. (*syn.* Nardosmia japonica).
officinalis, 1′ to 5′, Mch., My., wh. (*syns.* Tussilago Petasites and T. vulgaris). Bog Rhubarb, Butter Bur.

PETIVERIA (*syn.* MAPA).

One species (*ord.* Phytolaccaceæ), a branching stove shrub, which may be increased by cuttings of the half-ripened shoots. Soil, loam and peat, with sand.

Only Species and Variety :—

alliacea, 2′ to 3′, Je., st., wh. Guinea-hen Weed.
— octandra, lvs. smaller and dwarfer (*syn.* octandra).

PETREA (*syn.* PETRÆA).

Stove shrubs, including twiners (*ord.* Verbenaceæ), from tropical America, and several of them of great beauty. Propagated by cuttings, in a light, sandy soil, in bottom heat, covered by a bell-glass. Soil, turfy loam three parts, leaf mould one part, and old Mushroom bed manure one part, with one-sixth sand.

Principal Species :—

arborea, 12′, Je., st., bl., vio. (*syn.* erecta).
volubilis, 12′, Jy., st. cl., pur. Purple Wreath.

Petalolepis (*of Lessing, see Petalacte*).
Petasostylis (*see Leianthus*).

Other Species :—

macrostachya, 20′, Je., st. cl., lil. (*syn.* Stapeliæ). This is referred by *Index Kewensis* to guianensis, and Stapeliæ is kept distinct.
rugosa, 6′ to 8′, Jy., st., bl.

PETROBIUM (*syn.* LAXMANNIA OF FORSTER).

There is only one species (*ord.* Compositæ), and it is an ornamental stove tree, increased by cuttings. Soil, good, sandy loam.

Only Species :—

arboreum, Je., st. tree, yel.

PETROPHILA.

Greenhouse shrubs (*ord.* Proteaceæ). Very few are in cultivation. The same culture as for Banksia (which *see*) will suit.

Principal Species :—

acicularis, 2′, My., wh., red.

Other Species :—

heterophylla, 4′, Je., wh.
pulchella, 6 to 8 , Jy., wh. (*syn.* Protea pulchella).
rigida, 2′ to 3′, My., wh.
Serruriæ, 3′ to 4′, My., wh. (*syn.* glanduligera).

PETTERIA.

The only species, ramentacea (*syn.* Cytisus Weldenii, *ord.* Leguminosæ) is a hardy shrub of erect habit, requiring the same treatment as the hardy Cytisuses. It is of little garden value.

PETUNGA (*syns.* HIGGINSIA OF BLUME, and SPICILLARIA).

Glabrous stove shrubs (*ord.* Rubiaceæ), of branching, twiggy habit, and bearing white flowers. Propagated by cuttings in April, in sand, over bottom heat. Soil, fibrous peat and loam in equal parts, with one-fifth sand.

Principal Species :—

Roxburghii, 3′ to 8′, My., flowers small, wh.

PETUNIA.

Description.—Ornamental, half-hardy or hardy, annual or perennial herbs (*ord.* Solanaceæ), largely cultivated in pots and baskets, or used for bedding plants. For the latter purpose, the small-flowered, profuse-blooming varieties are best, the double varieties and those with large single flowers making handsome pot plants trained to a trellis or wire frame. The cultivated Petunias are derived from violacea and nyctaginiflora. Named varieties are not now largely grown, but a selection appears on p. 181.

Propagation.—By seeds, which germinate freely if sown in March in a hotbed, in light, fine soil, and only slightly covered with earth, as the seeds are very small. The seedlings ought to be pricked off as soon as they can be handled. They are afterwards potted off singly and pinched to make bushy and compact plants, growing them on near the glass in an intermediate temperature. Plants to be grown in pots may receive their final shift in May, when those for bedding should be hardened

Petrocallis (*see Draba*).
Petrocarya (*see Parinarium*).
Petrocoptis (*see Lychnis*).
Petrogeton (*see Crassula*).
Petroselinum (*see Parsley*).
Pettigree (*see Ruscus aculeatus*).
Pettigrue (*see Ruscus aculeatus*).
Pettywhin (*see Genista anglica*).

off, prior to planting out. Named varieties are grown from cuttings of young shoots taken in autumn and wintered in a warm greenhouse. Cuttings may be rooted in a warm frame in February, or even later.

Soil.—Good, rich loam and a third part of well-rotted manure.

Other Cultural Points.—Petunias under glass are attacked by green fly, for which occasionally fumigate. Those grown outside should have plenty of water while in growth, and be well staked, fastened to low trellises, or pegged down.

Principal Species :—

intermedia (now Salpiglossis linearis).
nyctaginiflora, 2′, Aug., hlf-hdy. ann., wh.
violacea, 6″ to 10″, prostrate, Aug., hlf-hdy. per., pur. vio. (*syns.* Nierembergia phœnicea and Salpiglossis integrifolia).

Selection of Double Petunias for Pots :—

Adonis.	Labyrinth.	Mrs. Webb.
Alice.	La Fiancée.	Odyssée.
Bayard.	Minnie Evans.	R. Knight.
Caprice.	Mrs. Sander.	Victoria.

Selection of Singles for Pots :—

Adolphe Aderer.	Charmer.	Madame Barbier.
Avalanche.	Dr. Tucker.	Purple King.
Beauty.	Elegans.	Tony Johannot.
C. de Houdetot.	Little Pet.	Van Bievlet.

Selection for Bedding :—

Most of these come almost true from seed.

Countess of Ellesmere.	Miranda.	Perfection.
Dr. Hogg.	Model.	Spitfire.
Holborn Blue.	Mrs. Charles Wilson.	Victoria. White Queen.

PEUCEDANUM.

A large genus of herbs and shrubs, annuals and perennials (*ord.* Umbelliferæ). From a garden point of view the principal species of note is sativum (*see* Parsnip). Several species, including the Sulphurwort (officinale), Masterwort (Ostruthium), and Milk Parsley (palustre) are British plants.

Principal Species :—

graveolens, 2′ to 3′, Je., Jy., yel. Dill.
Sativum, 2′ to 3′, Jy., Aug., hdy. ann. or bien., yel. (*syn.* Pastinaca sativa). Parsnip.

PEUMUS (*syn.* Boldea and Ruizia).

One species, Boldus (*ord.* Monimiaceæ), a dwarf, greenhouse, evergreen tree, with fragrant foliage, but of no interest to the decorative gardener. The leaves are used medicinally as an aid to digestion, and the bark is employed by tanners. The fruit is edible, and eaten in Chili. Propagation, by cuttings. Soil, sandy peat.

PFAFFIA.

Stove herbs of erect habit (*ord.* Amarantaceæ). Gnaphalioides, although a perennial, is best treated as an annual. Soil, two parts loam, one part leaf soil, and sand.

Principal Species :—

gnaphalioides, 1′, Je., wh.

PHACELIA.

Annual or perennial herbs (*ord.* Hydrophyllaceæ), which are mostly hardy in this country. The perennial species are not much cultivated, and should be grown from seeds or cuttings. The best are annuals, which grow in any good garden soil, treated as hardy annuals. Those named are annuals unless indicated otherwise.

Principal Species and Varieties :—

campanularia, 8″, sum. bl.
circinatiformis, 9″ to 18″, Je., bien., bl. or wh.
divaricata, My., vio., procumbent.
— wrangeliana, lvs. three-lobed.
Parryi, 1′, sum., vio.
sericea, 9″, Je., per., bluish pur. (*syn.* Eutoca sericea).
tanacetifolia, 2′, Je., bluish pk.
Whitlavia, 2′, Je.. bl. (*syn.* Whitlavia grandiflora, Harv.).
— alba, wh.
wrangeliana (*see* divaricata var.).

Other Species :—

bipinnatifida, 1′, Jy., ann. or bien., vio.
circinata, 2′, sum., bien. or per., bl.
congesta, 9″ to 15″, sum., bl.
Franklinii, 9″, My., bl.
Menziesii, 1′, Je., pur. (*syn.* Eutoca Menziesii and E. multiflora).
orcuttiana, 1′, sum., wh.

PHÆDRANASSA. (Queen Lily.)

Stove, greenhouse, and half-hardy bulbs (*ord.* Amaryllideæ), with showy flowers in umbels. Propagated by offsets, removed from the parent bulbs when the latter are at rest. Soil, good loam four parts, leaf mould one part, and enough sand to keep the whole porous. In winter they must be kept dry.

Principal Species :—

Carmioli, st., red, tipped grn.
Lehmanni, st., sc.
rubro-viridis, Ap., grh., grn., red (correctly Eustephia coccinea).

Other Species :—

chloracea, 1½′, grh., pur. ro., tipped grn. ; obtusa is a var.
eucrosioides (now Stricklandia eucrosioides).
obtusa (*see* chloracea var.).
schizantha, Oct., st. or grh., red.
viridiflora, grh., grn., yel.

PHÆNOCOMA.

Description.—There is only one species in this genus (*ord.* Compositæ), viz. prolifera, a charming plant, showy and distinct, although not of particularly easy culture. Specimen plants 3′ or 4′ in height may be obtained with care. The flowers last in full beauty for two or three months.

Propagation.—By cuttings of the young side shoots which are getting firm at the base, in sand, in gentle bottom heat.

Soil.—Fibrous peat and one-fourth sharp silver sand.

Other Cultural Points.—The old plants should be potted when starting into growth in the spring. Perfect drainage and firm potting are essentials. After the check of potting has been surmounted, keep the plants near the glass in an airy greenhouse. Later on in the summer a place in a cold frame on a moist ash bottom is about the best, but plenty of air must still be given, and abundance of water at all times.

Only Species and its Variety :—

prolifera, 3′ to 4′, sum., grh., crim., rosy pur., lvs. small, scale-like (*syns.* Helichrysum and Xeranthemum proliferum).
— Barnesii, flower heads of deeper hue, habit rather more compact.

PHÆNOSPERMA.

A genus of tall, hardy, ornamental Grasses (*ord.* Gramineæ) that may be easily raised from seed, sown in April. Ordinary garden soil.

Only Species :—

globosa, 6′, flowers in huge panicles.

Peyrousia (*of Sweet, see Lapeyrousia*).
Pfeiffera (*see Rhipsalis*).
Phaca (*see Astragalus*).

PHAIO-CALANTHE.

Bigeneric hybrid Orchids, obtained by the intercrossing of various species of Calanthe and Phaius, and requiring the same treatment as Phaius.

Principal Hybrids :—

[NOTE.—s. = sepals, p. = petals, l. = lip.]

Arnoldiæ (C. Regnieri × P. grandifolius), habit intermediate, s. and p. tawny, flushed gold, l. pale ro. pk.

berryana (P. Humblotii × C. Masuca), flowers intermediate in shape, ro.

Brandtiæ (P. assamicus × C. Veitchii), s. and p. pk., flushed yel., l. ro. pk.

irrorata (P. grandifolius × C. vestita), s. and p. creamy wh., shaded ro., l. reddish pur., wh.

sedeniana (P. grandifolius × C. Veitchii), s. and p. yellowish wh., flushed ro., l. wh., margined rosy pur., yel.

Other Hybrids :—

grandis (P. grandifolius × C. Bryan).

inquilina (P. vestitus × C. Masuca).

inspirata (P. grandifolius × C. Masuca).

Niobe (P. grandifolius × C. gigas).

PHAIUS OAKWOODIENSIS.

PHAIUS (*syn.* PHAJUS).

Description.—A small genus of epiphytal and terrestrial Orchids (*ord.* Orchidaceæ), from the Tropics of the Old World. The leaves are deep green, pleated, and usually of large size, with the base narrowed into a long petiole. The inflorescence is generally erect, rising in some species a yard or so high.

Propagation.—By division after flowering is over, severing the rhizomes of epiphytes with a sharp knife.

Compost.—Species like Humblotii need little more than clean sphagnum, but some fibrous peat may be added. Terrestrial species need fibrous loam and leaf soil or peat in equal parts, with dried cow manure and sand.

Special Cultural Points.—No species needs the very dry root conditions some Orchids require during the period of rest. All succeed in a stove, but maculatus is at home in an intermediate or cool house; Humblotii and simulans (tuberculosus of gardens) both love a very high temperature and atmospheric moisture.

Deciduous Species.—These differ so much in manner of growth, mode of flowering, and cultural needs from the evergreen ones that they are dealt with under their common garden title of Thunia (which *see*).

Principal Species and Varieties :—

[NOTE.—s. = sepals, p. = petals, l. = lip.]

bicolor, 1½′, spike 1½′ to 2½′, sum., s. and p. reddish br., l. wh., ro., yel.

— Oweniæ, l. yel., maroon pur.

Blumei, 2½′, spikes 4′, spr., s. and p. yellowish red, l. wh., crim., yel.; assamicus, Bernaysii, and sanderianus are distinct vars., the latter producing spikes 6′ to 8′ long in sum.

callosus, 2½, spike 3′ to 4′, sum., s. and p. reddish br., wh., ro., l. yellowish wh., ro. pur. (*syn.* Rumphii).

grandifolius, 2½′, spike 3′ to 4′, spr., s. and p. yellowish br., wh. reverse, l. br., rosy pur. (*syns.* giganteus and grandiflorus).

Humblotii, 1½′, spike 1½′ to 2½′, s. and p. rosy pur., wh., l. ro. pur., wh., reddish br., crim., yel.

— albus, s. and p. wh., l. ro., rosy pur., br., yel.

maculatus, 2½′, spike 2′ to 3′, spr., s. and p. yel., l. marked red. lvs. spotted yel.

simulans, 1′, spike 1′ to 2′, win., s. and p. wh., l. wh., ro., yel., or., crim. pur., epiphytal (*syn.* tuberculosus of gardens).

tuberculosus, 1½′ to 2′, spike 2′ to 3′, s. and p. wh., terrestrial (*syn.* Warpuri).

tuberculosus of gardens (*see* simulans).

Wallichii, 2½, spike 3′ to 5′, win., spr., s. and p. buff, red, wh. reverse, l. wh., yel., red.

— Mannii, flowers larger and darker.

Principal Hybrids :—

amabilis (grandifolius × simulans), win., s. and p. wh., pk., l. crim. pur., grn.

ashworthianus (Wallichii var. Mannii × maculatus), sum., s. and p. gold, l. marked reddish br.

Cooksoniæ (grandifolius × Humblotii), spr., s. and p. yel., l. yel., pur. br., ro.

Cooksonii (Wallichii × simulans), spr., s. and p. rosy yel., l. ro., rosy pur., yel.

Marthæ (Blumei × simulans), spr., s. and p. buff, spotted br., l. wh., yellowish br., ro.

Norman (Blumei var. sanderianus × simulans), spr., s. and p. yellowish pk., l. reddish pur., yel., ro., wh.

owenianus (bicolor var. Oweniæ × Humblotii), sum., s. and p. wh., tinged pur. br., l. crim. pur., yel., or.

Other Species, Hybrids, and Varieties :—

albus (*see* Thunia alba).

assamicus (*see* Blumei var.).

Bensoniæ (*see* Thunia Bensoniæ).

Bernaysii (*see* Blumei var.).

flavus, 2½′, spikes 2½′, sum., s. and p. yel., l. yel., reddish br.

giganteus (*see* grandifolius).

grandiflorus (*see* grandifolius).

inquilinus, sum., wh., yel.; hybrid, parentage unrecorded.

irroratus (*see* Phaio-Calanthe irrorata).

maculato - grandifolius (grandifolius × maculatus), aut., s. and p. yellowish ro., l. wh., crim., br.

Mannii (*see* Wallichii var.).

Marshalliæ (*see* Thunia Marshalliæ).

mishmiensis, 1½′, spike 1½′ to 2½′, sum., s. and p. ro. pk., l. ro. pk., wh., yel. (*syn.* roseus).

oakwoodiensis (Cooksonii × Humblotii), sum., s. and p. ro., l. rosy crim., or. (*see* figure).

orphanum (grandifolius × Marthæ), spr., s. and p. yellowish red, l. crim., ro., yel., reddish br.

Oweniæ (*see* bicolor var.).

philippinensis, 1½′, spike 1½′ to 2½′, sum., s. and p. reddish br., yel., wh. reverse, l. wh., pk., yel.

Phœbe (Blumei var. sanderianus × Humblotii), sum., s. and p. yellowish ro., l. ro., or., yel.

Phænocodon (*see Lapageria*).

roseus (*see* mishmiensis).
Rumphii (*see* callosus).
sanderianus (*see* Blumei var.).
veitchianus (*see* Thunia veitchiana).
Warpurii (*see* tuberculosus).

PHALÆNOPSIS.

Description.—A genus of about thirty species (*ord.* Orchidaceæ), natives of Eastern India and the Malay Archipelago. All are dwarf, short-stemmed plants, bearing a few thick leaves in two ranks. Usually the leaves are rich green, but in sanderiana, schilleriana, and veitchiana they are marbled with greyish green; in leucorrhoda, casta and stuartiana the marbling is evident on young foliage only; Mannii has violet margins and spots on its leaves. A ballot among Orchid lovers would probably result in a good majority in favour of Phalænopsis as the most beautiful genus. In the better known forms the flowers are about 3″ across, the sepals and petals being sufficiently broad to make up a full and rounded bloom; some species have starry flowers. The finest species have long, arching spikes, and these are sometimes branched and carry quite a large number of lovely blooms that by reason of their shape and pose have earned for the genus the popular title of Moth Orchids.

Propagation.—This is not easy, but in some instances when the stem has elongated somewhat it may be severed, provided there are sufficient roots left on the forward or apical portion to keep it growing; the beheaded portion will in all probability form a bud, or "back break," that with care and patience will develop into a plant. When a plant makes several leads, one may be removed if it is well rooted, but the severance must be gradual to guard against check. Lueddemanniana is most readily divided, and it occasionally forms plantlets on its flower stems. These latter, as well as those occasionally formed on the roots of stuartiana, must not be removed until roots have formed.

Cultural Requirements.—All the species succeed in suspended Teak baskets, or cylinders. The former should have preference. As the roots resent confinement the receptacles should be only just large enough to accommodate the specimens. In the best collections re-basketing is seldom practised, and the roots hang down in quantity from the small baskets. To ensure the escape of water, crocks must be placed in the bottom of the basket or cylinder, and should occupy half the space. Clean, live sphagnum moss is the only other material necessary, filling it among the roots in such a manner that the crown or collar is raised well above the rim of the receptacle. When a larger basket becomes a necessity it is a good plan to select one large enough to accommodate the old one, as it is scarcely possible to remove the roots without injury. Remove any bars to which no roots are attached, and let the roots pass between the bottom bars of the new basket, subsequently filling the spaces with crocks and sphagnum. Growth commences in March and new material and new baskets should be provided then, if necessary.

Temperature and Ventilation.—The season of growth extends from March to the end of October, and during that period the temperature should be 70° by night and 75° to 80° by day. From November to March 60° to 65° at night and 65° to 70° by day will suffice. The changes from the latter to the former figures, or *vice versâ*, should be gradual. Bottom ventilators opening on to the hot-water pipes afford the best means of ventilation, and from spring till late autumn air should be admitted through them in quantity regulated by the external conditions, always guarding against draughts. The house in which Phalænopses are grown should, if possible, be an inner one in a range, or the doors should open into another house, porch, or shed, so as to prevent the inward rush of unwarmed air. There is usually no great difficulty in arranging this, and it is trouble well repaid.

Moisture and Shading.—Excepting during the depth of winter, or foggy weather, it is hardly possible to keep the atmosphere too humid, for Phalænopses grow naturally in saturated atmospheres. Even Lowii, though not needing water at the roots when resting, would succumb in a dry atmosphere. Overhead watering and syringing are best avoided, though in one well-known collection no bad results appear to follow the former when practised during summer. From March to October give abundance of water, and damp down as often as necessary; from November to March give only enough water to keep the sphagnum fresh and green, and damp down only once or twice a day. Phalænopses love shade from sunshine or very bright light, and unless this is provided there will be scorched leafage and other ills. Besides the ordinary roof-blind, it is an advantage during summer to have a thin blind arranged curtain-like on rings and wires beneath the roof glass on the sunny side of the house. Particular attention to shading in early spring will keep the young and tender leaves from harm.

Principal Species and Varieties:—

[NOTE.—s. = sepals, p. = petals, l. = lip.]

The figures immediately following the name of the species indicate the length of the leaves.

amabilis, 1′, spike 2′ to 3′, win., wh., l. spotted red, shaded yel. (*syn.* grandiflora). The var. aurea has more yel. on l.

Aphrodite, 1′, spike 2′ to 3′, win., s. and p. wh., l. wh., yel., pur. (*syn.* amabilis of Lindley). The var. dayana has more pur. on l.

gloriosa, 1′, spike 2′ to 3′, win., s. and p. wh., l. wh., pur. By some, a var. of Aphrodite.

Lowii, 4″, spike 1′, sum., s. and p. wh., stained pur., l. pur., with wh., yel. spotted side lobes.

lueddemanniana, 8″, spike 8″ to 12″, s. and p. wh., barred pur., br., l. wh., pur.

rosea, 6″, spike 1′ to 2′, sum., aut., s. and p. wh., stained ro. pur., l. ro. pur. (*syn.* equestris); leucaspis is a brighter var. with wh. mottling.

sanderiana, 10″, spike 1½′ to 3′, win., s. and p. ro. pk., wh., l. wh., marked ro., pur., crest yel., spotted red. Alba, marmorata, and punctata are distinct vars.; sanderiana is probably a natural hybrid (Aphrodite × schilleriana).

schilleriana, 1¼′, spike 2′ to 4′, spr., s. and p. ro. pur., shaded wh., l. pur., wh., spotted red, stained yel., crest yel. Distinct vars. are major, purpurea, and vestalis.

speciosa, 10″, spike 1′ to 1½′, win., s. and p. pur., l. pur., or., wh. Imperatrix is a splendid var., with wh. marks on s. and p.

stuartiana, 1′, spike 1½′ to 3′, win., s. and p. wh., dotted pur., lower s. spotted reddish pur., l. wh. or yel., spotted reddish pur., side lobes yel., spotted pur. The best vars. are bella, nobilis and punctatissima.

sumatrana, 8″, spike 8″ to 12″. sum., s. and p. wh., reddish br., l. wh., or., pur. Good vars. are kimballiana, pauci-vittata, and sanguinea.

violacea, 7″, spike 6″ to 10″, sum., s. and p. wh., tinged grn., base vio. pur., lower s. vio. pur., tinged grn. at tips, l. vio. pur., yel. Alba, bowringiana, and schröderiana are good vars.

Principal Hybrids :—

Artemis (rosea × amabilis), s. and p. wh., shaded pur., l. pur., or.

F. L. Ames (amabilis × intermedia), s. and p. wh., l. reddish pur.

Harriettæ (amabilis × violacea), s. and p. wh., spotted ro. pur., l. wh. spotted pur., side lobes and apex deep ro. pur. (*syn.* violaceo-amabilis).

intermedia (Aphrodite × rosea), s. and p. wh., l. wh., base red, side lobes pur., apex reddish pur. Fine forms are brymeriana, Portei, and Vesta.

John Seden (amabilis × lueddemanniana), s. and p. wh., dotted pur., l. wh., spotted and stained pur.

leucorrhoda (Aphrodite × schilleriana), s. and p. wh., pur., l. pur. wh., spotted red, stained yel. Casta, Cynthia (probably the reverse cross), and youngiana are forms.

luedde-violacea (lueddemanniana × violacea), s. and p. wh., spotted pur., l. bright pur.

rothschildiana (schilleriana × amabilis), s. and p. wh., yel., l. wh., pur., yel.

veitchiana (schilleriana × rosea), s. and p. wh., flushed pur., l. wh., red, crim. pur.

Other Species, Varieties, and Hybrids :—

amabilis, of Lindley (*see* Aphrodite).

amethystina, 3″, spike 1′, aut., s. and p. wh., l. pur., wh.

Amphitrite (stuartiana × sanderiana), s. mauve, p. wh., pur., l. wh., yel., pur.

antennifera (*see* Esmeralda).

Boxallii, 6″, spike 6″ to 12″, spr., s. and p. yel., marked reddish br., l. wh., yel., pur.

buyssoniana, 6″, spike 1¼′ to 2½′, sum., s. crim. pur., wh., p. crim. pur., l. crim. pur., sc., yel.

Cassandra (stuartiana × rosea).

casta (*see* leucorrhoda var.).

Cornu-cervi, 8″, spike 1′, sum., aut., s. and p. yellowish grn., marked br., l. wh.

Cynthia (*see* leucorrhoda var.).

equestris (*see* rosea).

Esmeralda, 6″, spike 1¼′ to 2½′, sum., s. and p. pur., l. pur. (*syn.* antennifera).

grandiflora (*see* amabilis).

Hebe (rosea × sanderiana), s. and p. wh., ro., l. pur., yel., spotted reddish br.

Hermione (stuartiana × lueddemanniana).

Lady Rothschild (intermedia brymeriana × sanderiana), s. and p. wh., tinged ro. pur., l. pur., ro., yel., side lobes spotted br.

Mannii, 8″, spike 1′ to 1½′, spr., s. and p. yel., marked br., l. yel., shaded wh.

Mariæ, 8″, spike 1′ to 1¼′, win., s. and p. wh., yel., stained pur., br., l. wh., pur.

Mrs. J. H. Veitch (sanderiana × lueddemanniana).

Parishii, 3″, spike 4″, sum., s. and p. wh., l. yel., spotted pur., apex ro. pur., crest wh.

Schröderæ (leucorrhoda × intermedia Portei), s. and p. wh., shaded ro., l. wh., yel., spotted ro., br.

stuartiano - Mannii (Mannii × stuartiana), s. and p. yel., marked br., l. wh., br., yel.

tetraspis, 8″, spike 6″, sum., s. and p. wh., l. yel.

Valentini (Cornu-cervi × violacea), s. and p. wh., pur., upper s. pur., l. wh., spotted pur., apex deep pur.

Vesta (rosea leucaspis × Aphrodite) (*see* intermedia var.).

violaceo - amabilis (*see* Harriettæ).

PHALARIS.

Annual or perennial greenhouse or hardy Grasses (*ord.* Gramineæ) of easy culture. Propagation is by seeds, and by division of the root in spring for the perennials. Ordinary garden soil.

Principal Species and Varieties :—

arundinacea, 3′ to 5′, Jy., hdy. per. (*syn.* Digraphis arundinacea).

— variegata, lvs. striped wh., very pretty. Gardener's Garter, Lady's Garter, Ribbon Grass.

— gigantea, taller.

canariensis, 1½′, Jy., hdy. ann. Canary Grass.

PHALERIA.

Stove and greenhouse trees and shrubs (*ord.* Thymelæaceæ), very few of which are cultivated. Propagated by seeds sown on a hotbed, in spring, or by cuttings of the young shoots in brisk bottom heat. Soil, fibrous loam and peat in equal parts, with sand.

Principal Species :—

ambigua, My., cl., wh. or flushed yel., fragrant.

laurifolia, 6′, st., wh., Daphne-like odour.

PHARNACEUM (*syn.* GINGINSIA).

Annual or perennial herbs (*ord.* Ficoideæ) of low habit. The flowers are green or purple, and unattractive. Propagated by cuttings. Soil, sandy loam and peat in equal parts.

Principal Species :—

incanum, 6″; Oct.; grh. shrub, wh., grn.

lineare, My., Je., shrubby, prostrate, red.

PHARUS.

Stove Grasses (*ord.* Gramineæ). Only the variegated form of latifolius appeals much to gardeners. Treat like stove Bamboos.

Principal Species :—

latifolius, 1½′ to 3′, Jy., st., lvs. 6″ to 8″ long, 1½″ to 2″ broad.

— vittatus, handsomely banded wh. upon grn. (*syn.* vittatus).

PHASEOLUS.

Vulgaris (*ord.* Leguminosæ), the Dwarf French Bean, is a well-known vegetable, and multiflorus, the Scarlet Runner, is even more noteworthy. (For culture, *see* BEANS, DWARF FRENCH, and RUNNER.) For the stove species, seeds and cuttings for the perennials, seeds alone for the annuals, will serve. Soil, loam two-thirds, leaf mould one-third, and sand.

Principal Species and Varieties :—

multiflorus, Je., Sep., twiner, per., wh., sc. Scarlet Runner.

vulgaris, Je., Sep., ann., wh., lil. Dwarf French Bean.

Other Species :—

Caracalla, Aug., st. cl., per., yel. Climbing Snail Flower.

derasus, st. ann. cl., grn., wh.

lobatus, Sep., grh. per. cl., yel.

lunatus, st. cl., grn., yel.

perennis, 4′ to 10′, Jy., Aug., hdy. per. cl., pur.

semi-erectus, Jy., st. ann. twiner, grn., pur.

PHAYLOPSIS (*syns.* ÆTHEILEMA, and MICRANTHUS OF WENDLAND).

About a dozen species of stove or greenhouse shrubs (*ord.* Acanthaceæ), allied to Dædalacanthus, but of no cultural value. Parviflora (*syn.* longifolia of Sims) has been introduced, but it is never met with now.

PHEASANT'S EYE (*see* NARCISSUS POETICUS).

PHEBALIUM.

Greenhouse shrubs or dwarf trees (*ord.* Rutaceæ), chiefly South Australian. Propagated by cuttings of the young shoots, in sand, under a bell-glass. Soil, three parts sandy peat and one part loam.

Phalangium (*see Chlorogalum and Paradisia*).
Phalocallis (*see Cypella*).
Pharbitis (*see Ipomœa*).
Pharium (*see Bessera*).
Pheasant's Eye Adonis (*see Adonis*).

Principal Species :—

Billardieri, Ap., yel., lvs. silvery wh. beneath (*syn.* elatum).
lachnæoides, 3′, My., yel.
squamulosum, 2′, My., yel., branches scaly (*syn.* aureum).

Other Species :—

aureum (*see* squamulosum).
elatum (*see* Billardieri).

PHELYPÆA (*syns.* ANOPLANTHUS and MECRANOPLON IN PART).

A few species of curious and beautiful leafless herbs, of parasitic habit (*ord.* Orobanchaceæ). Foliata has been successfully cultivated upon the roots of Centaurea dealbata, and the seeds of both host and parasite should be sown together. Any ordinary garden soil.

Propagation. — By cuttings of young shoots, struck in heat under glass or in a moist cold frame in spring, by suckers at the same season, or by layers.
Soil. — Any good garden soil.

Principal Species and Varieties :—

coronarius, 2′ to 10′, My., wh. (*syn.* triflorus). Common Mock Orange.
— flore-pleno, double flowers.
— foliis argenteo-variegatis, lvs. variegated with wh.
— foliis-aureis, yel. lvs.
— Keteleeri flore-pleno, fine double flowers.
— nanus, dwarf.
wh. (*syns.* columbiensis, inodorus, inodorus var. grandiflorus, laxus of Lodd., speciosus, and Deutzia sanguinea).
— floribundus (*syns.* floribundus, grandiflorus of Lindley and *Botanical Register* t. 570, and latifolius).
— laxus, 4′ to 6′, Je., wh. (*syns.* humilis, ignea of

Photo : Cassell & Company, Ltd.

PHILADELPHUS LEMOINEI (*see p.* 186).

Principal Species :—

foliata, hdy., sc., large, 1″ across (*syns.* Anoplanthus Biebersteinii and foliata).

PHILADELPHUS. (MOCK ORANGE, SYRINGA.)

Description. — Ornamental hardy shrubs (*ord.* Saxifrageæ), with white, sometimes sweet-scented, flowers, and very desirable for the shrubbery or garden. Some of the new hybrids are very beautiful.

The pruning of Philadelphuses should receive attention. Many people fail with Lemoinei and others of that set through inattention to pruning. After the flowers are over, all old flowering shoots should be cut out or cut back to strong young shoots; by this means the best flowering wood is obtained. Mock Oranges are also good subjects for forcing.

— Satsumi, Maxim, a fine var. (*syn.* chinensis).
— tomentosus, lvs. tomentose (*syn.* tomentosus).
— verrucosus, 6′ to 9′, lvs. warted (*syn.* verrucosus).
— Zeyheri, larger and fewer flowers than type (*syn.* Zeyheri).
gordonianus, 10′, Jy., wh.
grandiflorus, 6′ to 10′, Je., (*syns.* Godohokeri, gracilis, villosus, etc.).
inodorus, 4′ to 6′, Je., wh.
mexicanus, Je., Jy., hlf-hdy., wh.

Other Species :—

Coulteri, 4′ to 8′, sum., hdy. or hlf-hdy., wh.
Falconeri, narrow petals, a garden form, possibly a var. of coronarius.
hirsutus, 3′, Je., wh.
gardens, and pubescens).
Lewisii, 6′ to 8′, Je., wh. (*syn.* thyrsiflorus).
— californicus (*syns.* coronarius nivalis and nivalis of gardens).
microphyllus, 2′ to 5′, sum., wh., said to be a shy bloomer, but not so in favourable soil; good for rockery (*see p.* 186).

Phegopteris (*see Polypodium*).

Principal Hybrids :—

Avalanche, 3′ to 6′, long, slender branches, wh., fragrant.
Boule d'Argent, double, wh., sweet scented (coronarius × Lemoinei).
Candelabre, dwarf habit, wh., large, sweet scented.
Fantaisie, wh., centre tinted ro. (Coulteri × Lemoinei var.).
Gerbe de Neige, arching habit, large, wh.
Lemoinei, 6′, wh., free bloomer (*see p.* 185).
— erectus, taller than Lemoinei, wh.
Manteau d'Hermine, double, creamy wh., free bloomer.
Mont Blanc, 4′ to 6′, pure wh., large.

PHILAGERIA.

One plant (*ord.* Liliaceæ), of hybrid origin, its parents being Philesia buxifolia and Lapageria rosea albiflora. It is a straggling, half-hardy shrub, with flexuous branches. Propagation, by cuttings, in a cool moist house. Soil, peat.

Only Member :—

Veitchii, flowers solitary, pendulous, ro.

PHILESIA.

An ornamental shrub (*ord.* Liliaceæ), with fine, Lapageria-like flowers. It is hardy in favoured localities in the south and south-west, but should generally be grown where it can be protected with glass in winter. Propagated by suckers. Soil, sandy peat.

Only Species :—

buxifolia, 4′, Je., red (*syn.* magellanica).
rosea (*see* Lapageria rosea).

PHILIBERTIA.

Stove or warm greenhouse twining shrubs and sub-shrubs (*ord.* Asclepiadeæ), suitable for clothing trellises, pillars, or the roofs of plant houses. Propagated by cuttings in sand, under a bell-glass, with bottom heat. Soil, loam and peat in equal parts, with sand.

Principal Species and Varieties :—

campanulata, 6′, Oct., grn., yel. (*syn.* Sarcostemma campanulatum of the *Botanical Register* 1846, 36).
gracilis, 6′, grh., shrubby, yel., red striped.
— grandiflora, grh. shrubby, Je., pur. (*syn.* grandiflora).

PHILLYREA. (Jasmine Box. Mock Privet.)

Pretty, hardy evergreen shrubs (*ord.* Oleaceæ). They make nice plants for the shrubbery, and are propagated by cuttings, struck under a hand-light. Common soil.

Photo : Cassell & Company, Ltd.

Philadelphus microphyllus (*see p.* 185).

Principal Species and Varieties

angustifolia, 10′, My., wh. (*syn.* media angustifolia).
— lanceolata, lvs. lance-shaped.
— rosmarinifolia, lvs. awl-shaped.
decora, 10′, My., wh. (*syns.* laurifolia, Medwedewi, vilmoriniana, and vilmoriensis).
latifolia, 20′ to 30′, My., wh. (*syns.* media latifolia and spinosa).
— ilicifolia, 10′ to 20′, My., Je., greenish wh.
— rotundifolia, lvs. rounded.
media, 15′, My., wh. (*syn.* variabilis media).
— buxifolia, lvs. oval-oblong.
— oleæfolia, 10′ to 12′, My., Je., greenish wh. (*syn.* oleafolia).

PHILODENDRON.

Description.—Stove shrubs, trees, and herbs, many of them climbers (*ord.* Aroideæ). The leaves are large and fleshy, and some are curiously cut, while many of the species are highly ornamental

foliage plants. For clothing walls, rustic tree stumps, and pillars, numbers of the Philodendrons have no equal. All of them revel in heat and moisture, and the presence of so many thick and fleshy aërial roots necessitates a free and regular use of the syringe excepting during very dull and cold weather.

Propagation.—The stems may be cut up into lengths, each having two or three nodes. Such pieces root quickly in a close case.

Soil.—Fibrous loam and peat in equal parts with sand. Drainage must be perfect, and a few pieces of charcoal mixed with the soil will help to keep the latter sweet.

Principal Species and Varieties :—

[NOTE.—s., spathe; sp., spadix.]

andreanum, lvs. 2′ to 3′ long, 10″ broad, metallic grn.; a splendid cl.
crassinervium, lvs. 1′ long, coppery underneath, s. blk. pur., sp. wh. or cream; cl.
devansayanum, lvs. red when young, dark grn. when old, stems red; cl.
eximium, lvs. grn., s. wh., grn., sp. wh.; cl.
fragrantissimum, lvs. 1½′ to 2′ long, Jan., s. cream, red, flowers very fragrant (*syn.* Caladium fragrantissimum of *Botanical Magazine* 3314).
grandifolium, lvs. 2′ long, grn., spotted pur., s. grn., buff, pk., sp. grn., wh.; cl. (*syn.* Caladium grandifolium of *Botanical Magazine* 3345).
Mamei, lvs. very large, heart-shaped, grn., wh., stemless.
melanochrysum, lvs. dark grn., gold flushed; cl.
nobile, s. ro. crim., wh.; like crassifolium, but larger.
pinnatifidum rubro-punctatum, lvs. 2′ long, pinnatifid, My., s. wh., dotted red, sp., yel., stemless (*syn.* rubro-punctatum of *Botanical Magazine* 5948).
sanguineum, lvs. dark grn., pur. beneath, s. grn.; cl.
Selloum, lvs. dark grn., bipinnatifid, s. grn., margined wh., arborescent. A distinct and pretty plant.
Simsii, lvs. 2′ long, 1½′ across, with pur. veins, Mch., s. crim. (*syn.* Caladium grandifolium of *Botanical Magazine* 2643).
verrucosum, lvs. heart-shaped, metallic grn., yel. when young, banded maroon (*syns.* Carderi, daguense, and Lindenii of gardens).
Williamsii, lvs. 2½′ long, s. grn., yel., sp. yel., trunk thick.

Other Species and Varieties :—

albo-vaginatum (*see* lacerum var.).
amazonicum (*see* laciniosum).
ambiguum (*see* ochrostemon).
asperatum, s. red, cl.
augustinum, lvs. 1½′ across, deeply divided.
bipennifolium (*see* panduræforme).
bipinnatifidum, lvs. 2′ long, s. red, br., grn., sp. wh.
brevilaminatum, s. red, grn., sp. wh., cl.
callæfolium of gardens (*see* Imbe).
calophyllum, s. creamy wh., crim., sp. wh.
cannæfolium, lvs. 1′ to 2′ long, dark grn.
Carderi (*see* verrucosum).
crinitum (*see* squamiferum).
daguense (*see* verrucosum).
dilaceratum (*see* Raphidophora).
disparile, s. yel., grn.
dolosum, lvs. bright grn.
Eichleri, close to Selloum.
elegans, lvs. pinnatifid, cl.
elongatum, s. yel., grn., wh., cl.
giganteum, s. pur., sp. wh., cl.
Glaziovii, lvs. 1½′ to 2′ long, 3″ to 5″ broad, s. yel., crim., cl., resembles crassinervium.
gloriosum, lvs. deep grn., veins wh., margins pk., cl.
hederaceum, lvs. bright grn., s. very large.
holtonianum (now Anthurium insigne).
Hookeri, close to grandifolium (*syn.* Caladium grandifolium of *Botanical Magazine* 3345).
Imbe, lvs. heart-shaped, s. grn., red, yel. (*syn.* callæfolium of gardens).
imperiale, close to asperatum, probably a var. of it. Laucheanum is a var.
lacerum, lvs. broadly lance-shaped, s. pur., yel. Albo-vaginatum is a var.
laciniosum, lvs., three-parted, s. grn., reddish pur., wh. (*syns.* Caladium pedatum and Philodendron laciniatum, amazonicum, pedatum, and quercifolium).
Lindenii (see verrucosum).
longilaminatum, s. pk., yel., cream, crim., sp. cream, cl.
Martinetii, resembles Melinonii.
Melinonii, s. yel., br., dwarf.
micans, close to scandens.
notabile, lvs. deep grn., heart-shaped, 2′ long.
ochrostemon, s. grn., yel., fruits yel. (*syn.* ambiguum).
ornatum, s., wh., sp., flesh, lvs. heart-shaped, triangular.
oxycardium (*see* scandens).
panduræforme, lvs. pale grn., s. yel., wh., cl. (*syn.* bipennifolium).
pedatum (*see* laciniosum).
pertusum (*see* Monstera deliciosa).
quercifolium (*see* laciniosum).
recurvifolium, lvs. grn., spotted red, cl.
robustum, lvs. large, emerald grn.
rubens, s. wh., grn., reddish pur., sp. wh., cl.
scandens, lvs. bright grn. above, red beneath (*syns.* cuspidatum and oxycardium). *Index Kewensis* refers this species to cuspidatum.
serpens, lvs. 1′ to 1½′ long, s. pk., yel., crim., sp. cream, cl.
Sodiroi, lvs. bright grn., dotted wh., cl.
speciosum, lvs. triangular, bright grn.
spectabile, lvs. 1′ to 1¼′ long and broad.
squamiferum, s. reddish pur., grn. (*syn.* crinitum).
tripartitum, lvs. three-parted, s. wh., grn.
Wendlandii, lvs. 1′ long, thick, rich grn.

PHILOTHECA.

Heath-like shrubs (*ord.* Rutaceæ) of erect habit. Australis is a pretty plant, well worth a place in the warm greenhouse. Propagated by cuttings of the young shoots in sand, under a bell-glass. Soil, sandy loam one part, sandy peat three parts.

Principal Species :—

australis, 2′, lvs. narrow, thick, fleshy, Ap., grh., pale red.

PHILYDRUM (*syn.* GARCINIANA).

The only species (*ord.* Philydraceæ) is a greenhouse biennial of no great beauty. Propagated by seeds. Soil, sandy loam and peat.

Only Species :—

glaberrimum (*see* Helmholtzia glaberrima).
lanuginosum, 2′ to 3′, Je., grh., yel.

PHINÆA.

Dwarf stove herbs (*ord.* Gesneraceæ) of erect habit. (For culture, *see* ACHIMENES.)

Principal Species and Varieties :—

albo-lineata, 9″, Sep., st., wh. (*syn.* Niphæa albo-lineata).
— reticulata, has reticulated veins (*syn.* Niphæa albo-lineata reticulata).
rubida, 6″, Jy., st., wh., plant covered with short red hairs (correctly Niphæa rubida).

PHLEBODIUM (*see* POLYPODIUM).

PHLEUM (*syn.* STELEPHUROS).

Hardy annual or perennial Grasses (*ord.* Gramineæ), several species of which are natives of

Philogyne (*see Narcissus*).
Philopodium rigidum (*see Muehlenbeckia adpressa*).
Phœnicophorium (*see Stevensonia*).

Britain, including the common pratense, the Cat's Tail or Timothy Grass. Propagation, by seeds. Any fairly fertile soil.

PHLOGACANTHUS (*syn.* LOXANTHUS).

Tall stove shrubs and herbs (*ord.* Acanthaceæ) with showy flowers. Propagation, by cuttings rooted in heat in spring. Soil, loam two parts, leaf mould one part, sand one-sixth.

Principal Species :—

asperulus, 3', Jan., st. shr., pur. red (*syns.* Justicia quadrangularis and asperula).
curviflorus, 3' to 6', Nov., st. shr., yel.

Other Species :—

guttatus, 2', spr., st. herb, yel.

PHLOMIS.

A large genus of hardy or half-hardy herbs and shrubs of easy culture (*ord.* Labiatæ), with purple, yellow, or white flowers. Propagation is by cuttings for the shrubs, by root division for the herbs. Any ordinary garden soil.

Principal Species :—

cashmeriana, 2', Jy., hdy. per. herb, lil., close to pungens.
ferruginea, 2' to 3', Je., hdy. shr., yel., branches clothed with rusty wool.
fruticosa, 2' to 4', Je., hdy. shr., yel. Jerusalem Sage.
Herba-venti, 1' to 1½', Jy., Sep., hdy. per. herb, pur., vio.

Other Species :—

armeniaca, 6" to 12", Je., Jy., hdy. per. herb, yel.
floccosa, 2', Jy., Oct., hlf-hdy. sub-shr., yel.
laciniata (*see* Eremostachys laciniata).
Leonurus (*see* Leonotis Leonurus).
lychnitis, 2', Jy., Aug., hdy. per. herb, yel. Lamp-wick.
pungens, 1½' to 2', Jy., hdy. per. herb, pur. vio. ; probably a var. of Herba-venti.
purpurea, 2', Jy., hdy. shr., pur. ro.
samia, 2' to 3', sum., hdy. herb, cream, yel., pk.
tuberosa, 3' to 5', Je., hdy. per. herb, pur. ro., roots tuberous.
viscosa, 3' to 5', Je., hdy. per. herb, yel. (*syns.* lunarifolia russelliana and russelliana).

PHLOX.

Description.—The Phlox (*ord.* Polemoniaceæ) in all its forms is one of the most valuable of garden flowers, and is an indispensable occupant of beds, borders, or rockeries. The spring-flowering species and their varieties make charming dwarf plants for rockeries, edgings, or the front of the borders ; the annuals are very showy and beautiful as bedding plants, and the later perennial species and varieties are among the most brilliant of border flowers, and look exceedingly handsome massed together in beds. The late species are almost superseded by the garden varieties and hybrids, and few need be named here.

Propagation.—The spring Phloxes of the subulata type are propagated by cuttings taken after flowering and inserted in light soil in pots under glass ; the annuals, varieties of Drummondii, by seeds sown in March in boxes under glass, or in a slight hotbed, or in April and May in the open. When large enough, prick off a few inches apart and keep in frames until May, giving air when the weather is favourable. The perennials are propagated by seeds sown on a gentle hotbed in spring, or in pots in a greenhouse when ripe. Named varieties are increased by division in spring or autumn, or by cuttings of the young shoots in spring or summer. Root cuttings are sometimes used.

Soil.—Spring Phloxes like a light, sandy loam with a little peat. The annuals and later flowering perennials should have a rich soil, with plenty of manure and a copious supply of water. Mulching with manure is also beneficial.

Principal Species and Varieties :—

[N.B.—All are hardy perennials unless otherwise marked.]

divaricata, 9" to 15", spr., lil. or bl.
— alba, wh.
— canadensis, bl.
— canadensis alba, wh.
Drummondii, 1', Aug., red, ro., pur., or wh. A charming hlf-hdy. ann. Many vars., including the following : cuspidata, pointed petals ; fimbriata or laciniata, fringed ; florepleno, double ; grandiflora, hortensiæflora, wh., and nana, dwarf.
maculata, 2', Jy., pur. Many forms.
ovata, 1 to 1½', spr., red, pur. (*syn.* triflora).
— caroliniana, taller.
paniculata, 3' to 4', Aug., pur. to wh. (*syn.* acuminata).
reptans, 4", spr., creeping, pur. or vio.
Stellaria, 1½', My., trailing, wh.
subulata, 1', Ap., trailing, pk. (*syn.* setacea ; for vars. *see* Selections). (*See p.* 189).

Other Species :—

adsurgens, 9" to 15", spr., ro.
amœna, 3" to 6", Je., pur., pk., or wh.
bifida, 9" spr., vio. pur.
glaberrima, 1' to 2', Jy., red.
— suffruticosa, 2', Je., ro. (*syn.* suffruticosa).
linearifolia, 9" to 12", Jy., pale pk.
pilosa, 1' to 2', My., pk., pur., ro.
procumbens, sum., trailing, lil.
verna, 6", spr., pk.

Selections :—

Spring-flowering varieties of subulata :—

alba, wh.
annulata, lil., dark eye.
atropurpurea, pur. ro.
compacta, pk.
frondosa, ro. red.
grandiflora, pk., crim. eye.
lilacina, lil.
Little Dot, pale lil., dark centre.
Model, ro.
Newry Seedling, lil.
The Bride, wh., ro. eye.
Vivid, bright ro.

Early Summer Phloxes of suffruticosa section (supposed to have been derived from glaberrima suffruticosa) :—

Attraction, wh., ro. crim. eye.
General Roberts, wh., pk. eye.
Harry Veitch, cream wh., crim. eye.
James Hunter, ro. pk.
Luna, wh., pk. eye.
Magnificence, ro. pk., crim. eye.
Magnum Bonum, ro. magenta, ro. eye.
Miss Lingard, wh., lil. eye.
Mrs. Forbes, pure wh.
Mrs. Hunter, wh., crim. eye.
Mrs. May, wh., pk., crim. eye.
The Shah, ro. pur.

Late-flowering Phloxes of decussata section (supposed to have been derived from maculata and paniculata) :—

New Varieties :—

Antonin Mercie, wh., lil. edge.
Archibald Forbes, ro. salmon, crim. eye.
Charles Flahault, lil., wh. centre.
Countess Grey, ro. vio., wh. centre.
John Fraser, light sc., paler centre.
L'Aiglon, ro. car., deeper eye.
Lord Kelvin, bright red.
Mrs. Burn, or. sc., crim. eye.
Mrs. Oliver, salmon.
Pat. Robertson, ro. car., crim. eye.
Roger Marx, car., pur. eye.
Tapis Blanc, wh., dwarf.

Older Varieties :—

Artaxis, heliotrope, wh. centre.
Cameron, wh., mauve centre.

Coquelicot, or. sc., pur. centre.
Derviche, dark lil., pur. centre.
Espérance, mauve, wh. centre.
Fédora, ro., wh. suffusion.
François Chabas, wh., car. eye.
John Forbes, pk., crim. eye.
Le Mahdi, vio. bl., bronze.
Le Siècle, salmon ro., lil. centre.
Liberté, or. salmon, car. centre.
Papillon, bl., lil.
Paul Bert, lil., vio. centre.
Rossignol, ro., mauve, wh. centre.
Roxelane, car.
W. E. Gladstone, ro.
William Robinson, ro. salmon, vio. centre.
Zouave, car. magenta.

PHŒNIX. (DATE PALMS.)

Description.—Stove and greenhouse Palms (*ord.* Palmæ), of elegant habit, and highly valued as decorative plants. The pinnæ in canariensis and sylvestris are close; in rupicola they are much farther apart.

Propagation is by imported seeds. Humilis Rœbelinii can only be increased by offsets or suckers. Seeds should be sown in sandy loam on a mild hotbed; or they may be placed singly in thumb pots, and the latter plunged in bottom heat. Date Palms raised from the stones of Dates by amateur gardeners as a rule grow very slowly under the inadequate heat given to them.

Soil.—Good loam which has been stacked with cow manure for a year, three parts, leaf mould one part, sand one-sixth.

Other Cultural Points.—Although revelling in plenty of heat, most of them may be grown in the cool conservatory during the summer. Canariensis, reclinata, sylvestris, and rupicola make excellent dwelling-room plants, and they can be employed in sub-tropical gardening. Large specimens produce a fine effect if plunged to the rims of the pots on the lawn, but must be lifted before frosty weather. Liberal supplies of water must be given at all times, with copious syringings and liquid manure during the summer.

Principal Species, Hybrids, and Varieties :—

[NOTE.—f. = fronds, and the colours apply to them.]

acaulis, 12′, f. 1′ to 3′ long, lower pinnæ spiny, grn., st.
canariensis, 6′ to 12′ in cultivation, f. 2′ to 5′ long, grey grn., st. or warm grh. (*syns.* Jubæ and tenuis). An elegant and useful Palm.
dactylifera, 100′ to 120′, f. 7′ to 14′ long, grey grn., fruit sweet, edible, st. Common Date Palm.
— cycadifolia, trunk 2′ thick, f. 5′ to 6′ long, st. (*syn.* cycadifolia).
humilis Rœbelinii, 3′ to 5′, f. 1′ to 2′ long, grey grn., warm grh.
hybrida (dactylifera × farinifera), f. 3′ to 4′ long, st., hybrid.
reclinata, 50′, f. 3′ to 7′, pinnæ broad, stout, grn., st. or warm grh. (*syns.* leonensis and zanzibarensis). Senegalensis and melanocarpa are vars. The latter has blk., edible fruits.
rupicola, 15′ to 20′, f. 2′ to 5′, semi-erect, pinnæ far apart, stiff, grh., grn. Useful decorative plant.
— foliis argenteo-variegatis, variegated foliage.
sylvestris, 40′, f. 7′ to 12′ long, pinnæ numerous, grh., greyish grn.; one of the hardiest. East Indian Wine Palm, Wild Date.

Other Species and Varieties :—

farinifera, 7′, f. 3′ to 4′ long, st.
humilis, dwarf, of tufted habit, st. and warm grh.
Hanceana, Loureiri, ouseleyana, and pedunculata are vars.

Photo: W. H. Wade, Edenburgh.

PHLOX SUBULATA (*see p.* 188).

Jubæ (*see* canariensis).
leonensis (*see* reclinata).
ouseleyana (*see* humilis var.).
paludosa, 12′ to 20′, f. 8′ to 10′ long, 4′ broad, st.
pusilla of Gærtner (*see* zeylanica); of Loureiro (*see* humilis Loureiri).
senegalensis (*see* reclinata var.).
spinosa, 6′ to 30′, st.
tenuis (*see* canariensis).
zanzibarensis (*see* reclinata).
zeylanica, 8′ to 20′, f. 7′ to 10′ long, fruits sc., then pur., st.

PHOLIDOCARPUS.

Stove Palms from the Malayan Archipelago (*ord.* Palmæ). Propagated by imported seeds. Soil, loam three parts, leaf mould one part, with sand.

Principal Species :—

Ibur, fronds like those of Borassus flabellifer, petioles spinous, st.

PHOLIDOTA (*syns.* CHELONANTHERA, in part, CRINONIA, and PTILOCNEMA. RATTLESNAKE ORCHID.)

A genus of stove Orchids (*ord.* Orchidaceæ), with creeping rhizomes, or one- or two-leaved pseudobulbs. They require to be treated like the Cœlogynes.

Principal Species :—

articulata, late sum., yel., wh., grn.
conchoidea, spr., yel., br.
imbricata, 1′, sum., yel-lowish wh., shaded grn. (*syn.* pallida).
ventricosa, 6″, wh. (*syn.* Cœlogyne ventricosa).

Other Species :—

assamica, close to imbricata, but has nearly round "bulbs."
convallarioides, close to, if not a *syn.* of, ventricosa.
Lugardii, 6″, wh.
pallida (*see* imbricata).
repens, flesh pk.

PHORMIUM. (NEW ZEALAND FLAX, FLAX LILY.)

Description.—A genus of noble, ornamental, perennial herbs (*ord.* Liliaceæ), with fine, sword-like leaves, and panicles of flowers. They make handsome greenhouse plants, especially the variegated forms, but several are quite hardy in many parts of the United Kingdom. In the neighbourhood of water they thrive well and show to great advantage. Young plants should be protected for a few winters.

Propagation.—By seeds, sown under glass as soon as ripe, or in spring, and by division in early spring.

Soil.—Any good loam.

Principal Species and Varieties :—

Colensoi (*see* cookianum).
cookianum, 3′ to 9′, sum., hdy., yel., grn. (*syns.* Colensoi and forsterianum).
— variegatum, banded with creamy wh.
Hookeri, 5′, Jy., nearly hdy., grn.
tenax, 6′, Aug., hdy. in Cornwall, yel. or red. Common New Zealand Flax.
— atropurpureum, hdy., lvs. pur.
— nigro-limbatum, hdy., lvs. margined blk. pur.
— nigro-pictum, hdy., lvs. edged pur.
— Powerscourt var., hdy., the freest bloomer.
— variegatum, lvs. striped yel., wh.
— Veitchii, lvs. striped creamy wh., narrow.

PHORODON.

This genus of Aphides differs little from other green fly in appearance. Humuli causes trouble amongst the Hop fields. Entomologists are of opinion that Humuli is the same insect which preys upon the young growth of the Plum and Damson in spring and in September, the period between being spent upon the Hop. Spraying with kerosene emulsion, or one of the other insecticides recommended for aphides, is advised. A forcible stream of clear water from the garden engine is excellent. Ladybirds, Hawk flies, and Golden-eyed flies should be encouraged.

Phoma effusa (*see Helleborus*).

PHOSPHATIC MANURE.

Phosphates of lime are the usual form in which phosphatic manures exist, and while most soils contain a quantity of these phosphates the store soon becomes exhausted under heavy and continuous cropping. Bones and coprolites are the principal sources of supply. Soluble phosphate, or superphosphate, of lime is obtained by treating bones with oil of vitriol (sulphuric acid), but the commercial superphosphate generally contains a quantity of insoluble phosphates and sulphate of lime. The phosphate is nominally insoluble, but becomes soluble when acted upon by the acid excreted by the root hairs of plants. These insoluble phosphates may be placed in the soil at any convenient season; they give up their constituents slowly, and little of their substance is washed away by heavy rains as is the case with the soluble phosphates contained in commercial superphosphate. The latter, however, is of the utmost value where comparatively quick results are desired, but it is not economy to apply it to the land in autumn. (*See also* ARTIFICIAL MANURES and MANURES.)

PHOTINIA. (LOQUAT.)

Half-hardy evergreen trees and shrubs (*ord.* Rosaceæ). Propagation, by cuttings of the side shoots, in sand, under a bell-glass; also by cleft grafting upon the common Quince, in April, the stock being worked close to the ground. Soil, sandy loam. The most popular species is japonica, the Japan Medlar.

Principal Species :—

japonica, 10′ to 20′, hdy. in sheltered places, wh., fruits or. red, small, edible; should be grown under cover if the fruit is required (*syn.* Mespilus japonica, correctly Eriobotrya japonica). Japan Medlar, Loquat.
serrulata, 10′ to 20′, Ap., Jy., wh. (*syn.* glabra and Cratægus glabra). Chinese Hawthorn.

Other Species :—

arbutifolia, 10′ to 20′, Jy., hdy., wh., young branches and leaf petioles red (*syn.* Cratægus arbutifolia). Californian Maybush.
elliptica, 30′, wh., fruits yel.
glabra (*see* serrulata).

PHRAGMATOBIA.

This genus is included amongst a few others collectively known as Tiger Moths. The Ruby Tiger Moth is fuliginosa; it is about 1½″ in wing spread, has dull reddish brown wings with two black dots, a brown head and thorax, and a pink abdomen. The yellowish brown larvæ may be seen in autumn seeking resting places for the winter. They emerge in the following spring, spin their cocoons in April and May, and pupate. The moths make their appearance in April.

The larvæ feed chiefly upon weeds, but in some instances they attack garden produce. Hand-picking is the remedy.

PHRAGMIDIUM.

A small genus of Fungi, popularly known as "Brands," and allied to Puccinea. Rubi - Idæi is the Raspberry, and mucronatum the Rose,

Brand. The spots which declare the presence of the fungus are first yellow, ultimately becoming dark brown or black. These "Brands" are not nearly so harmful as many other microscopic Fungi, but they do damage if the spots are numerous. Picking off and burning all the damaged leaves is an excellent plan. Spraying Raspberries with Bordeaux Mixture is not to be recommended, unless the fruit is to be sacrificed, but a solution of potassium sulphide (*see* FUNGICIDES) is efficacious for Roses.

PHRAGMITES (*syns.* ARUNDO of De Beauvois, and CZERNYA).

Tall perennial Grasses (*ord.* Gramineæ), related to Arundo. Communis, the Great Reed (*syn.* Arundo Phragmites), is a handsome British plant, growing by the side of ponds and streams to a height of 5′ to 8′. It has large drooping panicles of purple brown flowers, and these, when cut and dried, are useful for winter decoration. The dried culms make capital protective material, and rough mats made from them keep out frost. They may also be employed for roofing rough sheds. There is now a variegated form. Propagation, by division. Any ordinary soil will do, but the roots should be in the water.

PHRATORA.

The Willow-leaf Beetle (Phratora Vitellinæ) is a small, elliptic beetle of a metallic green or deep blue shade. Its larvæ feed upon the foliage of Willows and Poplars, skeletonising the leaves. The larvæ have white or yellow, black spotted bodies, and black heads, and there are generally two broods in the year. Spraying with Paris Green is the best remedy, and this is the treatment usually adopted when Osier beds are attacked.

PHRYMA. (LOPSEED, *syn.* LEPTOSTACHYA.)

One species of hardy herbaceous perennials (*ord.* Verbenaceæ), of no special value. Seeds and division of the roots are both available, and any garden soil will do.

Only Species :—

Leptostachya, 2′ to 4′, Aug., hdy., pur., small.

PHRYNIUM (*syn.* PHYLLODES).

Stove herbaceous perennials (*ord.* Scitamineæ). The cultural requirements are the same as for Calathea and Maranta (which *see*).

Principal Species :—

capitatum, Jy., lvs. 1′ to 1½′ long, grn.
Griffithii, lvs. 2′ long, petioles 2′ to 4′ long.
variegatum (*see* Maranta arundinacea variegata).

Other Species :—

coloratum (now Calathea colorata).
eximium (now Calathea propinqua).
Lubbersii (now Myrosma Lubbersii).
maculatum (now Dracæna phrynioides).
sanguineum (*see* Stromanthe sanguinea).
unilaterale (now Myrosma madagascariensis).

PHUOPSIS.

P. stylosa (*ord.* Rubiaceæ), 1′, summer, is a trailing herb with a foxy odour in the evening or during rain, and with pretty heads of small pink flowers. It makes a good border or rockery plant. Common soil.

Phryganocydia (*see Macfadyena*).
Phycella (*see Hippeastrum*).

PHYGELIUS.

Phygelius capensis, the Cape Figwort (*ord.* Scrophularineæ), is an exceedingly easy plant to grow, and makes a brave show in the garden. Propagation, by seeds and cuttings. The seeds should be sown on a gentle hotbed in March. A deep, rich soil is necessary.

Only Species :—

capensis, 3′, sum., hdy., sc. Cape Figwort.

PHYLICA.

Greenhouse evergreen shrubs and trees (*ord.* Rhamneæ), often Heath-like in appearance. Propagated by cuttings of the half-ripened shoots in sandy soil, under a bell-glass, in a close, warm frame. Soil, sandy peat, with charcoal. Free drainage.

Principal Species and Variety :—

plumosa, 1′ to 2′, Aug., Nov., whitish.
— squarrosa, 1½′ to 2′, Aug., Nov., wh. (*syn.* pubescens).
plumosa of Loddiges is a *syn.* of capitata.

Other Species :—

buxifolia, 6′, My., Sep., grn. (*syn.* Soulangia buxifolia).
capitata, 2′, My., Aug., wh. (*syn.* plumosa of Loddiges, and pubescens of Aiton).
ericoides, 3′, Ap., Sep., wh.
pubescens of Aiton (*see* capitata).
rubra, 3′, Dec., red (*syn.* Soulangia rubra).
spicata, Aug., wh., fleshy, small.
stipularis, 3′, My., Sep., wh. (*syn.* Trichocephalus stipularis).

PHYLLAGATHIS.

Handsome dwarf stove shrubs (*ord.* Melastomaceæ). Propagated by leaf cuttings, in a close, warm case. Soil, peat two parts, leaf mould one part, and sand.

Principal Species :—

rotundifolia, 1′ to 2′, Jy., pk. The lvs. are the showy part; they are 6″ to 9″ long, 4″ to 6″ broad, rich metallic grn, tinged red, dark red beneath.

Other Species :—

gymnantha, pk., lvs. bright grn., with prominent veins.
hirsuta, pk., petals and sepals rounded.

PHYLLANTHUS.

A large genus of curious plants (*ord.* Euphorbiaceæ). In many cases the branches are leaf-like. The flowers are small, and would be inconspicuous but for their numbers. Atropurpureus, pulcher, nivosus, and glaucescens (*syn.* Chantrieri) make handsome stove foliage plants. As the plants get older they lose much of their elegance, and thus frequent propagation is necessary. Propagation, by cuttings of hard shoots, in sandy soil and brisk heat. Soil, loam two parts, leaf mould one part, dried cow manure one part, and a few pieces of charcoal, with a liberal addition of sand. Firm potting is essential. Atropurpureus and nivosus are at their best when about 5′ high in 8″ pots. Syringe freely and regularly.

Principal Species :—

atropurpureus, st. shr., lvs. dark pur., plant like nivosus in habit.
glaucescens, st. shr., branches at right angles to stem, like pinnate lvs., dark grn. (*syn.* Chantrieri).
nivosus, st. shr., lvs. grn. and wh. or wholly wh.
pulcher, st., flowers yel., red, lvs. grn., a pretty shr. for table work (*syns.* Reidia glaucescens and Phyllanthus pallidifolius).

roseo-pictus, st., lvs. grn., crim., wh.; probably a garden var.
salviæfolius, like glaucescens in habit, sum., grh. shr., male flowers grn., female red.

Photo: Cassell & Company, Ltd.

PHYLLOCACTUS COOPERI (*see p.* 193).

Other Species :—

angustifolius, 2′, Jy., shr., red, branches narrow, deciduous (*syns.* elongatus, and Xylophylla montana and elongata).
elongatus (*see* angustifolius).
epiphyllanthus, 6″, Jy., shr., red, branches deciduous (*syns.* falcatus and Xylophylla falcata).
latifolius, 6′ to 8′, Sep., st. shr., calyx wh. (*syn.* Xylophylla latifolia of *Botanical Magazine* 1021).
linearis, 1′ to 2′, st., calyx wh.
montanus, st., branches persistent, calyx ro., a dwarf tree.
pallidifolius (*see* pulcher).
seemannianus, 2′, wh., branches long.
speciosus (*see* latifolius).

PHYLLARTHRON (*syn.* ARTHROPHYLLUM).

Glabrous stove shrubs (*ord.* Bignoniaceæ), all from Madagascar. Propagation is by cuttings of the short side shoots, in sand in a close frame, with bottom heat. Soil, sandy loam two parts, peat and leaf mould one part each, a few pieces of charcoal, and sand.

Principal Species :—

bojeranum, 3′, Jy., pk., funnel shaped (*syn.* Arthrophyllum madagascariense).

PHYLLERIUM.

A species of Phytoptus. Vitis preys upon the Vine, and causes a dense cushion of light coloured hairs to appear on the under surface of the leaves. At one time it was thought that these hairy patches were due to the action of a fungus to which the name Erineum, or Phyllerium Vitis, was given. (For treatment, *see* MITES.)

PHYLLIS.

The solitary species is a small greenhouse shrub (*ord.* Rubiaceæ), propagated by cuttings, in sand, in a gentle heat. Soil, good loam, with sand.

Only Species :—

Nobla, 3′, Je., wh.; pauciflora is a less floriferous var. Bastard Hare's Ears.

PHYLLOBIUS.

A genus of tiny beetles, belonging to the Weevil family, destructive to the young buds and leaves of fruit trees. The commonest species is oblongus, which has a black body and red or brown legs and wing cases. Pyri is equally voracious but scarcely so plentiful, and the same may be said of viridicollis, with the addition that it is smaller in size. Trees and bushes attacked should be shaken in the early morning, a white cloth being spread beneath to catch the beetles as they fall. They are thus quickly destroyed.

PHYLLOCACTUS.

Description.—Stove epiphytal succulent plants (*ord.* Cacteæ). Many hybrids and varieties have been raised, and this, combined with the peculiarly rich and soft hues of the flowers, has done much to bring Phyllocacti into prominence. The flowers are all large, and, with one or two exceptions, open by day; they are rather ephemeral, but healthy plants provide a succession of blooms over a fairly

Photo: Cassell & Company, Ltd.

PHYLLOCACTUS J. T. PEACOCK IMPROVED (*see p.* 193).

long period. Although naturally stove plants, many will do in the greenhouse and in the windows of an ordinary dwelling room. They will do outdoors in summer; in winter they need a dry atmosphere.

Propagation.—By cuttings and by seeds. Cuttings about 6″ long may be inserted in spring in well-drained, shallow pots, in sandy soil, and

placed in a temperature of about 60°. No water will be required for two or three weeks. Cuttings treated thus quickly root. Seeds ripen freely on healthy plants, and they germinate well if sown in spring in similar soil and temperature to that given to the cuttings.

Soil.—Three parts porous, rather sandy loam, one part leaf mould, and one part old mortar rubbish, well mixed. Free drainage.

Other Cultural Points.—Many fail with Phyllocacti by keeping them damp at the roots in winter. For two or three months in the middle of the dull season no water is needed. In summer a fair supply—about half as much as for soft-wooded subjects—will be required. From the end of June until the end of August the plants should be stood out of doors against a south wall.

Potting is not needed oftener than once in five or six years for established plants, but a top-dressing of the same soil as recommended for potting may be given annually. No shade should be given at any time. Staking is needed for big plants, and it is well to secure the stakes to the wall.

Principal Species :—

Ackermannii, 4′ to 6′, sum., st. or warm grh., stems flat, usually spineless, flowers rich crim., 6″ to 8″ across (*syns.* Cactus and Epiphyllum Ackermannii). Many vars.
anguliger, Oct., st. or warm grh., or. or yel., very fragrant.
crenatus, st., creamy wh., or., very fragrant. Many vars. Parent of many hybrids.
grandis, st., creamy wh., 1′ long, opening after sundown, very fragrant.
Hookeri, 2′ to 3′, Jy., Sep., st. or warm grh., wh., fragrant (*syn.* Cactus Phyllanthus of *Botanical Magazine* 2692).
latifrons, 8′ to 10′, st. or warm grh., cream, wh., very large, 8″ to 10″ across (*syns.* Cereus latifrons of *Botanical Magazine* 3813 and C. oxypetalus).
phyllanthoides, 1′ to 3′, Je., ro., wh., very floriferous (*syns.* Cactus phyllanthoides of *Botanical Magazine* 2092 and C. speciosus of *Botanical Register* 304).

Other Species :—

biformis, 3′, st., ro. pk. (*syn.* Disocactus biformis).
Phyllanthus, 1′ to 3′, Je., st., wh., cream wh. (*syn.* Cereus and Epiphyllum Phyllanthus).

Hybrids and Varieties.

Agatha, rosy pk., flushed salmon.
Albus Superbus, wh.
Brilliant, bright sc.
Cooperi, creamy wh. (*see p.* 192).
Delicatus, satin pk.
Elatior, crim. sc.
Epirus, pk.
Eva, or. sc., flushed apricot.
Exquisite, rosy pk.

A Selection :—

Isabel Watson, coral, or. red.
Jenkinsoni, rich crim.
J. T. Peacock Improved, bright rosy pk. (*see p.* 192).
Niobe, deep sc., pur. centre.
Orion, crim. sc.
Plato, bright sc.
Venus, crim., flushed vio.

PHYLLOCLADUS (*syn.* Thalamia. Celery-leaved Pine Tree.)

Greenhouse evergreen Conifers (*ord.* Coniferæ), with minute, scale-like leaves, and branches flattened and leaf-like (phyllodes). Propagation, by cuttings of the ripened shoots, in sand, in a close frame, in spring. Bottom heat may be given as soon as the bases of the cuttings begin to swell, not before. Soil, good loam, with a little sand.

Principal Species :—

[Note.—p. = phyllodes.]

glauca, p. fan-wedge shaped, shr. or small tree (*syn.* trichomanoides glauca).
hypophylla, 10′ to 30′, p. narrow.
rhomboidalis, 60′, p. ¾″ to 2″ long (*syns.* asplenifolia, and Podocarpus asplenifolius). Alpina is a dwarf var. Adventure Bay Pine.
trichomanoides, 40′, a slender tree.

PHYLLOSTACHYS.

A genus of Bamboos (*ord.* Gramineæ). The Phyllostachys include a number of plants of stately presence, and hardy enough to withstand an ordinary British winter. It is desirable that they should be planted in sheltered spots, for north and east winds would cripple them and spoil their beauty for a long time. (The culture is given under Arundinaria and Bambusa, which *see*.)

Principal Species and Varieties :—

[Note.—The synonymy here is in the main that of the *Kew Hand-List*.]

aurea, hdy., yel., grn. (*syns.* Bambusa aurea and sterilis of gardens and Taibô-chiku and Hotei-chiku of Japan, *see p.* 194).
boryana, hdy., culms grn. first, then yel.
Castillonis, 5′ to 7′, hdy., grn., or. striped, wh., culms grn., yel. (*syns.* Kimmei-chiku of Japan and Bambusa Castilloni and Castillonis).
fastuosa, hdy., bright grn. above, glaucous below (*syn.* Bambusa fastuosa).
fulva, hdy., yel., grn., habit of Henonis.
*Henonis, 8′ to 14′, hdy., bright grn., one of the best (*syns.* Ha-chiku and Bambusa Henonis).
marlicea, hdy., dark grn., culms dark grn., rare (*syns.* Shibo-chiku and Shiwa-chiku of Japan, and Bambusa marliacea of gardens).
*mitis, 20′ to 60′, hdy., culms grn. when young, yel. when old, a superb plant (*syns.* Bambusa mitis of gardens and Môsô-chiku).
nigra, 4′ to 7′, hdy. (*syns.* Bambusa nigra of gardens and Kuro-daké, Goma-daké, and Kuro-chiku of Japan, *see p.* 195).
— punctata, hdy., taller and hardier than type (*syn.* nigro-punctata of gardens).
Quilioi, 18′, hdy., dark grn., spotted br. (*syns.* Bambusa Mazelii of gardens and Quilioi).
sulphurea, 13′, hlf-hdy. like mitis but smaller (*syns.* Bambusa sulphurea and Me-daké of Japanese gardens).
*viridi-glaucescens, 18 to 20′, hdy., grn., glaucous, culms grn., then yel.; one of the best (*syn.* Bambusa viridi-glaucescens).

* Select for three.

Other Species :—

bambusoides, 10′ to 12′, hdy., culms yel. (*syn.* Ya-daké of Japan).
flexuosa, 6′ to 8′, hdy., lvs. like viridi-glaucescens (*syn.* Bambusa flexuosa of gardens, not Munro).
heterocycla, hdy. (*syns.* Bambusa heterocycla, and Kiko-chiku and Kimon-chiku of Japan). Tortoise-shell Bamboo.
ruscifolia, 1½′ to 3′, hdy., lvs. broad, grn., culms grn., channelled (*syns.* Kumasaca, Kumasasa, Bambusa ruscifolia and viminalis, and Bungozasa of Japan).
viminalis (*see* ruscifolia).
violascens, 13′, hlf-hdy., culms vio. then yellowish br. (*syn.* Bambusa violascens of gardens.

PHYLLOTA.

Greenhouse shrubs (*ord.* Leguminosæ) of Heath-like appearance, all from Australia. They answer to the same treatment as the Pultenæas, which *see*.

Principal Species :—

phylicoides, 2′, My., grh., yel. (*syns.* aspera, comosa, and squarrosa).

Phyllocalyx (*see Eugenia*).
Phyllodoce (*see Bryanthus*).
Phylloma (*see Lomatophyllum*).

PHYLLOTRETA.

Leaf-eating beetles, small, but lively, voracious, and an inveterate Turnip foe. In some respects they resemble Haltica, with which genus they have been placed. They have the same habits and may be caught and dealt with in the same way as the redoubtable TURNIP FLEA, which *see*.

PHYLLOXERA (*see* GRAPES).

Photo: Cassell & Company, Ltd.

PHYLLOSTACHYS AUREA (*see p.* 193)

PHYSALIS. (BLADDER, GROUND or WINTER CHERRY.)

Description.—A genus of about thirty species of hardy or greenhouse annual or perennial herbs (*ord.* Solanaceæ), best known in this country by the use made of the fruits of Alkekengi and Francheti, which have fine red inflated calyxes. The fruits of peruviana edulis, the Cape Gooseberry, are used occasionally for dessert. Those of Alkekengi are also said to be edible. Francheti is much the finest.

Propagation.—The annuals by seeds, sown in spring; the perennials by seeds or by division at the same season.

Soil.—Any good loam.

Principal Species and Varieties :—

Alkekengi, 1′, Jy., hdy. per., wh., fruit sc. Winter Cherry.
Francheti, 1½′, hdy. per., wh., calyx coral red; finer than above, perhaps a var. of it.
peruviana, 3′, Jy., hlf-hdy., whitish, fruit purplish. Cape Gooseberry.
— edulis, hlf-hdy., fruit yellowish (*syn.* edulis.).
— violacea, 3′, Jy., hlf-hdy., yel., fruit vio.

Phyllotænium (*see Xanthosoma*).
Phymatanthus (*see Pelargonium*).

PHYSOCHLAINA (*syn.* BELENIA).

Hardy, erect-habited herbs (*ord.* Solanaceæ), all perennials. Propagated by cuttings and seeds. Any ordinary fertile soil.

Principal Species :—

orientalis, 1′ to 1½′, Mch., My., pur., bl. (*syn.* Hyoscyamus orientalis).
physaloides, 1′ to 1½′, Mch., Ap., pur., vio. (*syn.* Hyoscyamus physaloides, now referred to Scopolia physaloides).
prealta, 1½′, Mch., grn., yel., marked pur. (*syn.* grandiflora).

Phymatodes (*see Polypodium*).
Physianthus (*see Araujia*).
Physic Nut (*see Jatropha*).
Physidium (*see Angelonia*).
Physocarpa (*see Neillia*).

PHYSOSIPHON.

Stove epiphytal Orchids (*ord.* Orchidaceæ), resembling the Pleurothallises in habit, and needing similar treatment. They are of little horticultural value, but Loddigesii is occasionally met with in collections.

Principal Species :—

Loddigesii, Jy., yel., grn., or red (*syn.* Stelis tubata).

Other Species :—

guatemalensis, yel., pur.; close to Loddigesii.
Lindleyi, grn., sepals red; close to Loddigesii.
punctulatus, grn., yel., spotted pur.

PHYSOSPERMUM. (Bladder Seed.)

Glabrous perennial herbs (*ord.* Umbelliferæ) of little horticultural value. The flowers are white, in umbels, and the leaves are much cut.

PHYSOSTEGIA. (False Dragon Head.)

Two or three species of hardy, erect-habited herbs (*ord.* Labiatæ), all from North America. They need the same culture as the members of the genus Dracocephalum.

Principal Species and Varieties :—

virginiana, 1½′ to 4′, Jy., Sep., flesh pk. or pur.; very variable (*syn.* Dracocephalum variegatum and virginianum).
— alba, flowers wh.
— nana, dwarf, pk. (*syn.* Regelii of gardens).
— speciosa, a fine var. with large spikes (*syns.* imbricata and Dracocephalum speciosum of Sweet).

Other Species :—

imbricata (*see* virginiana speciosa).
intermedia, 1′ to 3′, sum., pk. or pur.
parviflora, 1′ to 2′, sum., pk.
Regelii (*see* virginiana nana).

PHYSOSTELMA.

Two species of climbing stove shrubs (*ord.* Asclepiadeæ), answering to the same cultural treatment as Hoya. Probably only one species is in cultivation, and that one is by no means common.

Principal Species :—

Wallichii, My., grn., yel., lvs. leathery (*syns.* campanulatum and Hoya campanulata).

PHYSOSTIGMA. (Ordeal Bean of Old Calabar.)

There is only one species of Physostigma—two by *Index Kewensis*—(*ord.* Leguminosæ), a tall, climbing, stove herb, of no garden value but with a sinister reputation of its own. The seeds are virulently poisonous, and are employed by the natives of Old Calabar in their witch-finding functions. Suspects are made to eat the Beans until they vomit or die, the first contingency being taken to prove innocence, the second guilt. The poison has also the property of causing contraction in the pupil of the eye.

Only Species :—

venenosum, flowers pur., pods 6″ long, seeds 1″ long, nearly round. Ordeal Bean.

PHYSURUS.

Stove, terrestrial Orchids (*ord.* Orchidaceæ), bearing prettily marked leaves for the most part.

Physopoda (*see Thrips*).

The genus is closely related to Ancectochilus, and several species have figured in both genera. The cultural hints given for Ancectochilus will apply here also. Comparatively few species are in cultivation.

Principal Species :—

argenteus, 4″, lvs. 2½″ long, 1½″ broad, light grn., margined silver (*syn.* Ancectochilus argenteus).
nobilis, lvs. ovate, dark grn., veined silver; close to pictus (*syn.* A. nobilis).
pictus, 6″, lvs. 3″ long, 1½″ broad, edged dark grn., with a central silver band and wh. veins (*syns.* A. argenteus pictus and Microchilus pictus).
— holargyreus, lvs. wholly silvery.

Photo : Cassell & Company, Ltd.

Phyllostachys nigra (*see p.* 193).

Other Species :—

chinensis, lvs. 4″ long, grn., tufted.
decorus, lvs. dark grn., striped wh., flowers wh., grn.
fimbrillaris, lvs. dark grn., veined silver. flowers wh., lip yel. fringed.
maculatus, 6″, lvs. 2½″ long, dark grn., spotted wh.
Ortgiesii, lvs. dark grn., spotted darker, with wh. ribs.
querceticolus, 3″ to 4″, lvs. 2″ to 3″ long, light grn., blotched silver.

PHYTELEPHAS.

Dwarf, spineless Palms (*ord.* Palmæ), all needing a stove temperature. They are of easy culture when a liberal supply of water and free drainage are given. Propagation, by imported seeds, sown in strong heat. Soil, loam three parts, cow manure and leaf mould one part each, with sand. The hard seeds furnish the popular vegetable ivory so much used by turners in the manufacture of toys, buttons, and useful domestic articles. When nicely polished the appearance is almost equal to that of animal ivory.

Principal Species :—

macrocarpa, 6′, lvs. 15′ to 20′ long, pinnate, arching. Ivory Nut Palm.

Other Species :—

microcarpa, stemless, lvs. 20′ to 24′ long.

PHYTEUMA. (Horned Rampion.)

Ornamental hardy perennials (*ord.* Campanulaceæ), of value for borders or rockwork. Propagation, by division or by seeds in spring. The smaller species, such as comosum, do best in well-drained but moist crevices in the rockery in a gritty soil; the others grow in common soil.

Principal Species :—

Balbisii, 6″, sum., wh.
comosum, 4″, Jy., bl.
Halleri, 6″, My., vio.
hemisphæricum, 1′, Jy., bl.
humile, 4″, Jy., bl.
limonifolium, 2½′, Je., bl. (*syns.* strictum and virgatum of Loddiges).
Michelii, 1½′, Jy., bl. (*syns.* betonicæfolium of Vill., and scorzonerifolium).
nigrum, 6″, Jy., red, bl.
orbiculare, 1′, Je., bl.
pauciflorum, 4″, Jy., bl.
Scheuchzeri, 1′, My., bl.
— Charmelii, 9″, My., bl.
Sieberi, 3″ to 6″, My., bl.
spicatum, 1′ to 2½′, Jy., wh. or bl.

PHYTOLACCA.

Hardy, greenhouse or stove herbs, shrubs, or trees (*ord.* Phytolaccaceæ), whose flowers are followed by black berries, often in bunches. Only a few are in cultivation, and the undernamed are among the best of these. Propagated by seeds or division. Common soil.

Principal Species :—

acinosa, 2′ to 5′, sum., hdy., wh.; regarded by some authorities as a var. of decandra.
decandra, 3′ to 10′, sum., hdy. per., wh., roots poisonous. Virginian Poke-weed, Pigeon Berry.
— albo-variegata, lvs. variegated.
dioica, 20′ to 30′, sum., grh. per., wh. (*syns.* arborea of gardens and Phytolacca dioica).
icosandra, 3′, sum., hlf-hdy. per., wh. (*syn.* mexicana).
octandra, 3′ to 8′, sum., hdy. per., wh.

PHYTOPHTHORA.

A genus of microscopic parasitic Fungi, small in number of species, but possessing an enormous power for mischief. The two species best known are infestans and Fagi. Infestans, once placed in the closely allied genus Peronospora, is known as the cause of the Potato murrain, but it also attacks the Tomato, as well as the Bitter Sweet (Solanum Dulcamara) and Schizanthus. Although its activity is generally confined to the members of the order Solanaceæ, it occasionally grows upon members of Scrophularineæ. Fagi (*syn.* omnivora) causes a troublesome disease, often attended with fatal consequences, in young Beech seedlings. It attacks many cultivated Conifers, and occasionally Maples and such low-growing plants as Sempervivums and Clarkias.

The life cycle closely approaches that of the Peronosporas, and the two genera are, in fact, only separated by differences in the production of the fruit (conidia), these conidia being borne several in succession by one (branch) conidiophore, instead of one conidium to a conidiophore, as in Peronospora.

It is only by repeated attentions that it can be kept at bay. The production of winter or resting spores has not yet been settled satisfactorily in Phytophthora infestans. The following are the best means of battling with the Potato disease :—

1. Protective earthing up to prevent direct infection of the tubers.
2. Spraying with Bordeaux Mixture at intervals through the growing season to prevent infection of the leaves and stems.
3. Allowing 3′ between the rows, to favour rapid drying of the foliage, thus removing one of the chief aids to infection.
4. The destruction by fire of all diseased haulms and Potatoes.
5. Dressings of gas lime in autumn—from 12 lb. to 15 lb. per square pole.
6. Careful selection and frequent change of seed.
7. The selection of disease-resisting varieties. (*See also* Potato.)

When Fagi attacks young Beech trees it generally makes its presence felt very early in the life of the plant. The little plants commence to turn black and die shortly after germination. The first "rough" leaves may make their appearance before the fateful spots show, but if the weather is damp these spots increase in size with great rapidity. Where the disease has made its appearance in a seed bed the latter must be thoroughly disinfected before being again used, and even then five years at least should elapse before Beech seed is sown upon the spot. All infected plants should be burned.

PHYTOPTUS.

The genus Phytoptus has a sinister repute. Several species injure cultivated plants. Ribis causes the Big Bud in Black Currants; Pyri attacks the leaves of the Pear, and Avellanæ the Hazel and Filbert. These Gall Mites, as they are popularly called, are of microscopic proportions. Their habit of secreting themselves in the interior of the buds renders them exceedingly difficult of detection. Avellanæ has been noticed in considerable numbers in various fruit-growing districts, and it seems that it is only the severe annual pruning of the trees that has kept the pest under control. All such prunings should be burnt, and, where occasional swollen buds are seen, they also should be picked off and burnt. The common wild Hazel is as liable to attacks by the mites as the cultivated trees, and there is not the hard annual pruning to keep the pest in check, although it is probable that the summer clippings would help materially—that is, if they were burnt at once. (For Ribis, *see* Black Currants and Mites.) Pyri, which causes galls upon the leaves of Pears, behaves in a rather different manner. At first, and until just before the fall of the leaves, the mites are ensconced inside the yellow galls or blisters. In severe attacks these galls become confluent, and the whole surface of the leaf is involved. Just before the leaves fall

Phytarrhiza (*see Tillandsia*).

the mites leave the galls and take up their abode in the buds, where they pass the winter underneath the scales, ready to attack the young leaves in the spring. Light attacks may be dealt with by the removal and destruction by fire of the infected leaves prior to the exit of the mites within; but for bad attacks, and where whole orchards are concerned, this is obviously impracticable. Kerosene emulsion applied whilst the trees are at rest and

Photo: Cassell & Company, Ltd

PICEA MORINDA (*see p.* 198).

the mites hibernating has been tried with considerable success, and, although trees so treated have been observed to open their buds rather later than usual in the spring, they have apparently taken no appreciable harm.

PIARANTHUS.

Low-growing, greenhouse succulents (*ord.* Asclepiadeæ), all from South Africa. In general habit they are much like the Stapelias, to which they have been referred by some botanists, and like which they may be treated. Very few, if any, of the species are in cultivation. Pullus is now Boucerosia mammillaris; and piliferus, Trichocaulon piliferum.

PICEA (*syn.* ABIES of DON. SPRUCE FIRS).

Description.—A comparatively small genus of tall-growing, handsome Conifers (*ord.* Coniferæ), that is small so far as number of recognised species is considered. Alba, excelsa, and pungens, to mention only a few, have given rise to many handsome garden varieties, differing from each other in habit, disposition of the branches, and colour of the leaves; and most of the other species are represented in gardens by several varieties. All are hardy, with one or two exceptions, such as obovata, where growth is made so early in spring that it gets cut down by the late frosts. The genus is closely allied to Abies. In Abies the bracts fall away from the axis of the cone when maturity is reached; in Picea they do not do this. Further, in Abies the cones are upright on the branches; in Picea they are usually pendulous. In Abies the leaves are usually flattened, blunt, and soft to the touch. In Picea they are round, much stiffer, and often sharp.

Propagation.—The most satisfactory method is by seed, sown in spring. The seedlings may be lifted and planted in nursery rows as soon as they are a few inches high. Subsequent transplantings will depend upon the rapidity of growth, which in its turn will, in great measure, be decided by the species—some, such as excelsa, are very quick growers. The various coloured forms, which will not come true from seed, may be grafted upon seedlings of the type.

Soil.—Almost any soil will do, but the finest specimens are to be found on deep, sandy loam deposits. A little leaf mould may be used to lighten the soil in the rockery, in which the dwarf forms of excelsa appear to advantage.

Economic Products.—The Piceas are essentially timber producers, and both alba and excelsa take high rank as such. Excelsa furnishes the white deal so much in demand.

Principal Species and Varieties:—

[NOTE.—The synonymy is that of the *Kew Hand-List.*]

* Belonging to the Omorica group, or flat-leaved Spruce Firs.

*ajanensis, 70′ to 80′, shoots yellowish br., cones 1″ to 2″ long, erect, resembles excelsa (*syns.* Abies ajanensis and alcockiana, and Tsuga ajanensis); microsperma (*syn.* jezoensis) is a var.

alba, 30′ to 40′, cones oblong, cylindrical, light br., lvs. rather glaucous, erect (*syns.* Abies alba, A. a. cærulea arctica, and A. canadensis, Picea cærulea, and P. nigra glauca, and Pinus laxa and P. rubra violacea). White Spruce. Many vars. The following are some of the best:—

— cærulea, lvs. with bl. shade.

— echinoformis, dwarf and close-growing.

— fastigiata, of pyramidal habit.

— intermedia, cones and lvs. very short.

— pendula, branches drooping.

— variegata, lvs. yel., wh., grn.

alcockiana, 90′ to 120′, cones 2″ to 3″ long, deflexed, habit pyramidal (*syns.* Abies acicularis, alcockiana, and bicolor, and Pinus alcockiana).

Engelmannii of Engelmann, not of gardens, 80′ to 100′, lvs. deep grn., rigid, cones 2″ to 2½″ long (*syns.* Abies alba, A. Engelmannii, and A. nigra, and Pinus commutata).

— glauca, lvs. silvery glaucous. A pretty var.

ericoides, a slender growing tree of pyramidal habit. A garden var. whose affinities have not yet been determined.

excelsa, 80′ to 100′ (*syns.* Abies excelsa, A. Picea, and A. rubra, and Pinus Abies and P. excelsa of Lambert). Burgundy Pitch Tree, Norway Spruce Fir. The following is a selection of the many vars.:—

— argenteo-spica, lvs. silver tipped.

— attenuata, slender, lvs. small and closely set.
— aurea, lvs. long, grn., gold-tipped.
— clanbrasiliana, 4′ high, dwarf, and close-growing. Stricta is an erect-growing sub-var.
— compacta, dwarf, neat habited.
— diffusa, very dwarf, good for rockeries.
— dumosa, dwarf, neat, pyramidal, a slow grower.
— eremita, like monstrosa, but shorter branches, bark red.
— finedonensis, young lvs. and wood yel., then bronze br., then grn.
— gregoryana, conical, bright grn.
— inverta, a weeping form.
— monstrosa, branches long and straggling.
— mutabilis, young lvs. yel. in spring.
— pygmæa, 1′, dwarf, pyramidal, good for pots and rockeries (*syn.* nana).
— pyramidalis, dwarf, conical, rockeries.
Morinda, 80′ to 120′, lvs. grn., cones ovate, oblong, 6″ broad; a hardy species, and one of the best for cold soils and exposed situations (*syns.* smithiana, Abies Khutrow and A. smithiana, and Pinus Khutrow, *see p.* 197).
*Omorica, lvs. with strong midribs, cones Larch-like (*syn.* Pinus Omorika).
orientalis, lvs. solitary, cones nearly cylindrical (*syns.* Abies orientalis and A. wittmanniana, and Pinus orientalis).
— aurea, bronze grn., gold.
polita, lvs. short, erect, grn., cones ellipsoid, 3″ to 4″ long; a beautiful specimen tree for lawns (*syns.* Abies Torano and A. polita).
pungens, lvs. bluish grn., bark grey; a tall tree (*syns.* commutata, Engelmannii of gardens, and parryana and Abies Menziesii in part, and Parlatorei). Rocky Mountain Blue Spruce.
— argentea, silvery glaucous.
— glauca, glaucous grn.; a charming plant (*see p.* 199). Pendula is a weeping sub-var.
rubra, 50′, small lvs. and small pendulous br. cones, elegant (*syns.* nigra var. rubra, Abies nigra var. rubra, A. rubra, and A. rubra arctica.
*sitchensis, 50′ to 70′, cones 2″ long, pendulous, cylindrical, branches regularly whorled, stiff (*syns.* Menziesii and sitkaensis, Abies Menziesii and A. sitchensis, and Pinus Menziesii and P. sitchensis).

Other Species and Varieties :—

alpestris, resembles excelsa, but has shorter, thicker lvs.
breweriana, 80′ to 90′, resembles excelsa, branches long, drooping, and whip-like.
californica (*see* Tsuga pattoniana).
cærulea (*see* alba var.).
Glehnii, lvs. crowded, in many rows, cones linear oblong, a dwarf tree.
jezoensis (*see* ajanensis microsperma).
Maximowiczii, lvs. rigid, dark grn., plant not a good doer (*syns.* Abies Maximowiczii and Picea obovata japonica).
Menziesii (*see* sitchensis).
nigra, 50′ to 80′, cones about 2″ long, cylindrical, has economic but not decorative qualities (*syns.* Abies alba, A. americana, and A. arctica of gardens, and Pinus mariana and P. nigra of Aiton). Black Spruce. Aureo-marginata is a pretty grn. and gold var., and fastigiata is pyramidal in habit.
obovata, something like excelsa, but a slower grower, and more tender.
— schrenkiana, a tall tree from the Altai Mountains (*syn.* schrenkiana).
parryana (*see* pungens).
smithiana (*see* Morinda).
Tsuga (*see* Tsuga Sieboldii).
vulgaris (*see* excelsa).

PICK.

The common pick is an exceedingly handy tool for loosening and breaking up old paths or hard ground that is being deeply bastard trenched for the first time. One arm ends in a point, and the other in a blade. Pickaxe is a name also frequently applied to it.

PICOTEE.

The name Picotee has been given by the florist to a section of Carnations in which the petals have a distinct edging of a different hue from that of the ground colour. No mottlings or stripes are admissible upon the ground colour, which must be either white or yellow, according to the class. The presence of any such markings would cause the flower to be relegated to the ranks of the Fancies. Recently it has been decided to consider as Fancies many varieties which had hitherto been grown and shown as Picotees.

It has been averred that the Picotees are more tender in constitution than the Carnations proper, but although this might have been true ten years ago, it is so no longer, for modern varieties have gained much in constitution.

The white-ground Picotees are subdivided, according to the colour of their edgings, into purple, red, and rose. A further classification deals with the quality of the edging, whether it be light or heavy. Thus Redbraes, so useful for cutting, would be described as a heavy purple-edged, white-ground Picotee. In the yellow-grounds the flower has reached its highest development in point of size and substance of petal, while the white-grounds are characterised by especial refinement, and although thinner and smaller than the yellow-grounds, the individual petals are large and of considerable substance. They must overlap each other regularly, and form a perfectly continuous circular outline, rising slightly towards the centre. For cultivation, *see* CARNATION. The undermentioned is a good selection :—

White-grounds :—

[NOTE.—H = heavy edged. L = light edged.]

Red Edged. L :—

Acme.	Mrs. Bower.	Souvenir de Headland.
Grace Darling.	Mrs. Gorton.	Violet Douglas.

Red Edged. H :—

Brunette.	Etna.	Mrs. Lovatt.
Dr. Epps.	John Smith.	Princess of Wales.

Purple Edged. L :—

Amelia.	Baroness	Portia.
Ann Lord.	Burdett-Coutts.	Silvia.
		Somerhill.

Purple Edged. H :—

Calypso.	Mrs. Openshaw.	Nymph.
Fanny Tett.	Muriel.	Zerlina.

Rose and Scarlet Edged. L :—

Douglas.	Fortrose.	Melpomene.
Ethel.	Liddington's	Psyche.
Europa.	Favourite.	

Rose and Scarlet Edged. H :—

Clio.	Mrs. Beswick.	Mrs. Sharpe.
Little Phil.	Mrs. Foster.	Mrs. William Barron.

Yellow-grounds :—

[NOTE.—The colour refers to the edge.]

Badminton, deep red.	Lady St. Oswald, bright red.
Childe Harold, light ro.	Lauzan, pur.
Cowslip, bright ro.	Mrs. R. Sydenham.
Dervish, lil. ro.	The Gift, deep red.
Eldorado, rosy red.	Xerxes, deep ro.
Heather Bell, bright ro.	
His Excellency, light red.	

PICRIDIUM.

Hardy, glabrous, annual or perennial herbs (*ord.* Compositæ), of which probably only one species, tingitanum, is to be found in gardens. Propagation, by division. Ordinary garden soil.

Principal Species :—

tingitanum, 1½′, Jy., hdy., yel. (*syn.* Scorzonera orientalis).

Principal Species :—

aristata, 5′ to 10′, Je., Jy., st., yel. (*syn.* Æschynomene aristata).

squamata, 6′, sum., st., yel. (now referred to Ormocarpum sennoides).

PIERIS.

Hardy trees or shrubs (*ord.* Ericaceæ), with white or red flowers. Being of symmetrical habit and medium height they produce a better effect when planted in masses than as solitary specimens. A bed or two filled with them may find a place upon the lawn or in the American garden, and the plants form admirable companions for Liliums, which may be planted between. Propagation, by layers in autumn, and by seeds sown as soon as they are ripe, preferably in cool frames. Soil, sandy peat. A well-drained situation is imperative. In heavy, cold, tenacious soils, which are waterlogged in winter, the plants do not thrive.

Photo: Cassell & Company, Ltd.

PICEA PUNGENS GLAUCA (*see p.* 198).

PICRORHIZA.

The only species, Kurrooa, is a hardy perennial herb (*ord.* Scrophularineæ) of no great value, as it rarely blooms.

PICTETIA.

Stove evergreen shrubs (*ord.* Leguminosæ), handsome, but rarely grown. Propagation, by cuttings, in sand, under a bell-glass, in brisk heat. Soil, loam and sandy peat in equal parts.

Principal Species and Varieties :—

floribunda, 2′ to 6′, Ap., My., wh.; the best of all (*syns.* Andromeda, Leucothoë, Portuna, and Zenobia floribunda).
formosa, ev. shr., hdy. only in sheltered places, wh. (*syn.* Andromeda formosa).
japonica, wh., in long, drooping clusters, lvs. very thick (*syn.* Andromeda japonica). Some botanists consider this to be a var. of ovalifolia.
— variegata, lvs. margined wh. (*syn.* Andromeda japonica variegata).

Other Species :—

mariana, 2′ to 4′, My., Je., wh., large (*syns.* Andromeda, Leucothoë, and Lyonia mariana).
nitida, 2′ to 6′, Mch., My., ev. shr., wh., red, or pur. (*syns.* Andromeda coriacea, lucida of Lam., marginata, and Leucothoë coriacea).
ovalifolia, 20′ to 40′, My., hlf-hdy., flesh pk., branches are poisonous (*syn.* Andromeda ovalifolia).
— densiflora, wh.

PIERIS.

A genus of butterflies whose caterpillars are destructive of the Brassica tribe. Brassicæ, the Large White Cabbage Butterfly, is the most common. The first brood is on the wing from May to July, and the second from September to October. The eggs, which are bright yellow, are laid singly, and affixed to the leaves of the Cabbages.

The Small White Butterfly, Rapæ, has also two broods in the season, one in April and one in July, and the caterpillars are full-fed in about three weeks from the time of hatching; they are generally green. (For remedies, *see* CABBAGE ENEMIES.)

PIGAFETTA.

The three species of this genus of stove Palms (*ord.* Palmæ) are tall, noble-looking plants, with spiny trunks of very hard wood. The leaves are large and elegant in their droop, but the plants are rarely cultivated. Propagation, by seeds. Soil, good loam. Firm potting is advisable.

Principal Species :—

elata, tall, st., lvs. like those of Cocos, petioles spiny (*syns.* Hyospathe elata of gardens and Metroxylon elatum).

PILEA (*syns.* ADIKE and DEBREUILIA. STINGLESS NETTLE.)

There are many species in this genus (*ord.* Urticaceæ), but none of them appeal to the gardener save muscosa (*syn.* microphylla), the Artillery Plant. This is in great request for filling small vases for dinner table and dwelling room decoration. The finely cut, but fleshy, light green stems and small leaves, with the reddish flowers and fruits, are very ornamental, and the plants stand fairly well in summer. Propagation, by cuttings in sandy soil, in a warm, close pit with bottom heat. Seeds and divisions are likewise available. Six cuttings may be placed in a 4″ pot and the plants used for decoration. No potting is required, but a constant supply of cuttings should be kept up to furnish decorative material. Larger specimens may be grown if desired, but the small ones are far more useful. Established plants need plenty of heat and water, and revel in regular syringings. Soil, loam, leaf mould, and sand.

Principal Species :—

muscosa, 4″ to 6″, sum., st., flowers small, reddish br., stems much branched (*syn.* microphylla of Liebm.). Artillery or Pistol Plant.

Pigeon Berry (*see Phytolacca decandra*).
Pigeon Grass (*see Verbena officinalis*).
Pigeon Pea (*see Cajanus indicus*).
Pig Lily (*see Richardia africana*).
Pig Nut (*see Carya porcina*).
Pig Root (*see Sisyrinchium*).

PILEANTHUS.

A small genus of Heath-like shrubs (*ord.* Myrtaceæ), all Australian evergreens, and needing a greenhouse temperature. Propagation, by 3″ cuttings of the young shoots in spring, in sand, under a bell-glass. Soil, loam and peat in equal parts, and one-sixth sand.

Principal Species :—

Limacis, 2′ to 3′, Ap., wh.

PILOCARPUS.

Stove shrubs with green or purple flowers (*ord.* Rutaceæ), of little worth to the gardener. Jaborandi is one of the plants that furnish the Jaborandi of commerce.

PILOCEREUS.

A small genus of succulent plants (*ord.* Cacteæ), of singular appearance. They are included in the larger genus Cereus, but have been kept distinct for garden purposes. Most of the species are of easy cultivation in a greenhouse temperature, and may be treated exactly like the other cool house Cereuses. The plants very rarely flower, but the spines and the long white hairs constitute the chief attraction. Young plants of senilis are more woolly than old ones. A greenhouse temperature is required, except where otherwise stated.

Principal Species :—

senilis, 1′ to 3′, stem cylindrical, fluted, 30 to 40 furrows, spines wh., hairs long, wh. The stems are tender and fleshy when young. Old Man Cactus.

Other Species :—

Brünnowii, stem erect, cylindrical, hairs long, wh.
celsianus, stems columnar, pale grn., prickles yel. (*syn.* foveolatus); several vars.
Curtisii, 3′, sum., flowers olive grn., ro., in tufts of wh. wool.
Dantwitzii, stem oblong, bright grn., hair long, wh., cottony.
fossulatus, stem club shaped, 10 to 12 angled, spines br., hairs wh., strong; rare.
Hoppenstedtii, warm house, stems columnar, 8 to 20 angled.
Houllettii, flowers vio., spines straw yel., whole plant felted.

PILULARIA. (PILLWORT.)

Obscure little aquatics (*ord.* Marsileaceæ), worthless to the gardener, but interesting to the botanist as link plants. Globulifera is common in damp British meadows. It has bright green leaves from 1″ to 4″ long. The capsules in which the spores are borne are like pills.

PIMELEA (*syns.* BANKSIA of FORSTER, and COOKIA).

Description.—Greenhouse trees, shrubs, and herbs (*ord.* Thymelæaceæ), natives of Australia and New Zealand.

Pilewort (*see Ranunculus Ficaria*).
Pilogyne (*see Melothria and Zehneria*).
Pilumna (*see Trichopilia*).

Propagation.—Cuttings of the young shoots, taken off with a heel of the old wood attached when they are about 2″ long, may be rooted in spring, in sandy peat. The cuttings should be covered with a bell-glass, placed in an intermediate house, kept close, and carefully shaded. About 75 per cent. will be a good "strike." Imported seeds are also available.

Soil.—Fibrous peat three parts, loam three parts, and silver sand one-sixth of the whole, for established plants. Younger ones are better in all peat and sand.

Other Cultural Points.—Potting must be firm and drainage free, as the plants need plenty of water at all times, especially when they are growing fast. Liquid cow manure may be given a few weeks before flowering. After flowering the plants must be cut hard back to the old wood, and repotted as the young growths make their appearance. A common stopping is not advisable, only pinching those shoots which spoil the symmetry of the plants. Syringe freely to keep down red spider.

Principal Species :—

ferruginea, 1′ to 2′, My., ro. or red, in globular heads (*syns.* decussata and diosmæfolia).

ligustrina hypericina, 5′ to 6′, My., wh., in globular heads (*syns.* elegans hypericina and ligustrina of *Botanical Register* 1827).

rosea, 2′ to 3′, Je., pk. or wh., close to ferruginea but more slender in growth (*syn.* Hendersonii).

spectabilis, 3′ to 4′, 1′ to 1½′ is a handy size, My., wh., flushed pk., in large globular heads (*syn.* Verschaffeltii). The best of all (*see* figure).

suaveolens, 1′ to 3′, Ap., yel., in globular heads (*syn.* macrocephala).

Photo : Cassell & Company Ltd.

PIMELEA SPECTABILIS.

Other Species :—

drupacea, 2′ to 6′, My., wh., flushed pk. Victorian Bird Cherry.

glauca, 6″ to 18″, Je., wh. (*syns.* humilis of Lindley and intermedia).

hispida, 2′ to 4′, My., blush pk.

linifolia, 1′ to 3′, My., wh. (*syns.* filamentosa, linoides, and paludosa).

longiflora, 1′ to 4′, Je., wh.

nivea, 4′, Je., wh. (*syn.* incana).

sericea, 1′ to 2′, My., wh., lvs. covered with silky wh. hairs (*syn.* lanata of Hemsley).

sylvestris, 2′ to 3′, Je., blush pk.; var. grandiflora has broader lvs.

PIMENTA.

Stove trees (*ord.* Myrtaceæ) with aromatic foliage. The leaves of acris have astringent properties and are much used for sauces; the berries, too, are aromatic and edible. Propagation, by cuttings of ripe or partially ripe shoots in a close, warm frame, in sandy soil. Soil, sandy loam and leaf mould in equal parts. Free drainage, liberal supplies of water, firm potting or tubbing, and regular syringings are the four essentials to

success. Tubs are better than pots for the big plants.

Principal Species :—

acris, 20′ to 40′, My., Jy., flowers wh., flushed pk., berries as large as Peas. Wild Clove, Black Cinnamon.

officinalis, My., Jy., wh., lvs. very aromatic (*syns.* vulgaris, and Eugenia and Myrtus Pimenta). Allspice, Pimento Bush,

PIMPINELLA. (Burnet Saxifrage.)

A large genus of annual and perennial herbs (*ord.* Umbelliferæ), most of them worthless horticulturally. The flowers are white or yellow, and the leaves pinnate. Magna and Saxifraga, the Burnet Saxifrage, are British wildlings. Anisum yields the Aniseed of commerce.

PINANGA.

Stove Palms (*ord.* Palmæ) of dwarf habit and slender stems. Not generally cultivated. Propagation is by imported seeds sown in brisk bottom heat. Soil, one part loam, two parts peat, and sand. Firm potting and liberal waterings are required.

Principal Species :—

[Note.—The height given is that of the trunk.]

coronata, 15′ to 20′, lvs. pinnatisect (*syn.* Seaforthia coronata).
Dicksonii, 16′ to 18′, lvs. pinnate.
disticha, 2′ to 6′, lvs. 1′ to 1¼′ long, few leaflets (*syn.* Ptychosperma disticha).
gracilis, 6′ to 20′, lvs. 3′ to 4′ long, pinnate.
lepida, young lvs. brownish crim.; best when young.
maculata, lvs. pinnate, dark grn.
malayana, 8′ to 12′, pinnate (*syns.* malaiana and Seaforthia malaiana).
paradoxa, 3′ to 6′, very slender, lvs. 1′ long, usually entire.
sanderiana, lvs. 2-lobed, grn. mottled petioles, freckled br.
spectabilis, lvs. dark grn., silvery beneath pinnate.

PINCHING.

The removal of the points of growing shoots while they are yet soft and tender. This is an important operation, and yet it is one that is often neglected. Pinching works in two ways; (1) it favours the production of more growths, and with a better equalisation of energy tends to the formation of a more symmetrical plant; and (2) the development of flower buds instead of wood buds, as in fruit trees. Many plants require pinching to remove their tendency to make straggling growths of unequal strength. A few familiar examples are Fuchsias, Pelargoniums, Salvias, Coleuses, and bush Chrysanthemums (*see* Chrysanthemums). Edging plants in summer beds have to be pinched to keep them within bounds; fruiting growths of Figs are pinched at the fifth or sixth leaf, to prevent the loss of energy upon leaves, and to effect its direct concentration upon the development of the fruit. Apples, Pears, Plums, Gooseberries, Currants, Peaches, Nectarines, Apricots, and Sweet Cherries have their laterals pinched to promote the formation of flower buds in place of wood or growth buds. This must not be done very early in the season, otherwise strong sub-lateral growths will push. For details, *see* the various fruits mentioned.

Pimpernel (*see Anagallis*).
Pinaster (*see Pinus*).

PINCKNEYA (*syns.* Pinknea and Pinkneya).

The only species—*Index Kewensis* gives two—(*ord.* Rubiaceæ) is a small, greenhouse or half-hardy tree. Propagation, by imported seeds, in sandy peat, in a close frame. Soil, loam and sandy peat in equal parts.

Only Species :—

pubens, 20′, sum., pur., bracts large, showy, pk., the conspicuous part of the flower. Bitter Bark Tree.

PINE (*see* Pinus and Pineapple).

PINEAPPLE.

Description.—A native of tropical America, the Pineapple (Ananas sativa) is cultivated in Asia, Africa, and America for its rich fruit. Pines were at one time extensively grown in British gardens. For species, *see* Ananas.

Propagation.—The chief method of keeping up the supply of fruiting plants is by suckers. March to September is the best time for removing these. If twisted off carefully, the ends trimmed, and inserted in 6″ pots in a temperature of 70°, with brisk bottom heat, these soon root and make plants. Seed may be sown in light, firm, sandy soil, and the pans plunged in bottom heat. "Crowns" and "gills" are utilised when a rare variety is to be propagated speedily. Crowns are the shoots at the top of the fruits, and gills are sucker-like offshoots from just below the fruit.

Soil.—Light, fibrous loam, chopped or pulled to pieces, four parts, and fibrous peat one part, will do for soil; and to five barrowloads of this may be added half a bushel of ½″ bones.

Other Cultural Points.—Pot culture is almost exclusively adopted under glass. The drainage must be free, and the potting firm. A good fruiting size is a 12″ pot. After fruiting, the plants may be moved into another pit to complete the development of their suckers. Plenty of light, a summer night minimum of 70° to 75°, a winter night minimum of 65°, and a 5° to 10° rise by day, must be given. The pots should be plunged in Oak leaves or tan above the hot-water pipes. During summer plenty of water is required, and liquid manure when the fruiting stems appear. Little water is requisite during winter. Draughts should be avoided.

Insect Pests.—Mealy bug and white scale are the most troublesome insects. Regular syringings with tepid soft water during the summer will keep the latter at bay. Kerosene emulsion (*see* Insecticides) is also useful.

A Selection of Varieties :—

Black Jamaica, oval, win., 4 lb. to 5 lb., bronze yel.
Lady Beatrice Lambton, conical, win., 8 lb. to 9 lb., or., yel. flesh.
*Queen, cylindrical, 3 lb. to 8 lb., very juicy and sweet, flesh pale yel., good keeper. One of the best for general use. Ripley Queen is a good form.
*Smooth-leaved Cayenne, cylindrical, 6 lb. to 9 lb., flesh pale yel., very rich and sweet; not a good sucker bearer.

* Select either of these for one variety.

Other Varieties :—

Charlotte Rothschild, cylindrical, 7 lb. to 10 lb., golden yel. flesh. Requires more heat.
Hurst House, pyramidal, sum., 6 lb. (*syn.* Fairrie's Queen).
Lord Carrington, pyramidal, win., 4 lb. to 7 lb.
Thoresby Queen, 6 lb. to 8 lb., or. yel. flesh (*syn.* Bennett's Seedling).

PINELLIA.

An unimportant genus (*ord.* Aroideæ). The plants are of no garden value, and are only to be found in botanic establishments.

PINGUICULA.

Greenhouse and hardy perennial herbs (*ord.* Lentibularieæ), found in boggy places, and needing, under cultivation, an approach to these conditions. The leaves are mostly fleshy, and covered in many cases with glandular hairs, which excrete a glutinous fluid, employed by the plants as a trap for insects, from which they are able to obtain part of their food. Propagation is by seeds, leaf cuttings, and division. Leaf cuttings of the hardy species should be placed in a close but not warm frame. Divisions will start away more freely if they also are kept close for a fortnight. The hardy species do well if they can be given a sheltered, boggy nook in the lower levels of the rockery. Pot plants should be grown in peat and sphagnum, with a few crocks intermixed. The drainage must be free and the water supply liberal all through the year.

Photo: Cassell & Company, Ltd.

PINUS EXCELSA (*see p.* 206).

Principal Species:—

alpina, 3″, My., Je., hdy., wh., lip yel.

caudata, 6″, aut., grh., rich car., lvs. in rosettes, very fleshy; the handsomest of all (*syns.* bakeriana and Flosmulionis).

grandiflora, sum., hdy., bl., vio., 1″ across, a pretty bog plant.

vulgaris, 4″ to 6″, My. Jy., hdy., vio.; British. Bog Violet, Butter Wort.

Other Species :—

bakeriana (*see* caudata).
Flos-mulionis (*see* caudata).
hirtiflora, hdy., close to vulgaris, but paler flowers with yel. throat.
lusitanica, 6″, Je., Oct., hdy., lil., yel.; British.
lutea, 3″, Je., hlf-hdy., yel.
orchidioides, 3″ to 4″, Oct., grh., vio. pur., 1¼″ across; probably a var. of caudata, and referred to that species by *Index Kewensis*.
vallisneriæfolia, sum.,hlf-hdy., pale pur. or lil.

PINK.

Description.—The garden Pink and its varieties are descendants of Dianthus plumarius (*ord.* Caryophylleæ). The white, sweet-scented Pink is a great favourite in cottage gardens. The flowers are in great demand for cutting, and the plant is of the easiest cultivation. Show or Laced Pinks have larger and finer flowers, but the perfume is neither so strong nor so sweet.

Propagation.—By seeds, layers, and cuttings. Cuttings are usually relied on. Select young side shoots after the flowering season is over, prepare them as for Carnation cuttings, dibble them into a bed of light, sandy soil, and cover them with hand-lights. They must be kept close until roots are formed. An occasional sprinkling overhead is helpful.

Soil.—A medium loamy soil, well enriched with humus, and mortar rubbish.

Other Cultural Points.—September is the best month in which to plant. Some of the highly bred laced varieties are not so hardy. Go over newly made beds after frosty spells and push back into their places any plants that may have been lifted out of the ground. Established beds benefit by a top-dressing of short, well-decayed manure in March, and another in September or October. Disbudding is necessary for big flowers. Old clumps are apt to get bare in the centre; they may be split up and planted in new soil.

The border section may be forwarded gently under glass. Plants intended for this should be potted in September and wintered in a cold frame.

Varieties, a Selection of :—

Border or Forcing Pinks :—

Albino, very large, pure wh.
Anne Boleyn, rosy pur., dark pur. centre.
Bueno Retiro, wh., ro. centre.
Capo di Monti, wh., ro. margin and centre.
Clove Pink, ro., very fragrant, a good companion to Mrs. Sinkins.
Ernest Ladhams, flesh pk., blotched crim.
Her Majesty, large, pure wh.
Homer, dark crim., fringed ro.
Mrs. Pettifer, wh., laced light pur.
Mrs. Sinkins, pure wh., very sweet, best for cutting.
Tom Welch, peach, laced crim., fringed.
Zurich, wh., crim. centre.

Show or Laced Pinks :—

Chantilly, wh., maroon centre.
Clara, deep red centre and lacing.
Empress of India, wh., laced rosy pur.
Godfrey, rosy red centre.
Harry Hooper, reddish pur. lacing.
Minerva, ro. centre.
Mrs. Waite, wh., red centre, laced.
Old Chelsea, ro. centre, lacing rosy red.
Reliance, red, wh., laced.
Sarah, wh., red centre, laced.
The Rector, wh.,rosy pur. centre, laced.

Pin Pillar (*see Opuntia curassavica*).

PINUS. (Deal Tree, Pine Tree.)

Description.—A large genus (*ord.* Coniferæ), of importance decoratively and economically. The genus Pinus is essentially one of tall timber trees of noble presence, hardy for the most part. A few dwarf varieties have been raised from time to time in gardens.

Of vigorous constitution, the Pines will grow in almost any soil; sylvestris, the Scotch Fir, likes a peaty and sandy medium. Extensive woods of the Scotch Fir are to be found in the peaty districts of Hampshire, Berkshire, and parts of Surrey, as well as in Northern Britain. A gravelly soil will occasionally produce remarkably fine specimens, and two magnificent trees are growing in such a medium at Aldermaston Court in Berkshire. Pinaster and Pinea thrive in shallow, sandy soil, near to the sea coast; banksiana and ponderosa will grow in a soil so dry that other vegetation will die; and rigida prefers a moist, even a swampy, medium. Laricio and most of its varieties like a rich soil and rather sheltered spots, while no position is too bleak or windswept, no winter too severe, for lambertiana.

The Pines generally appear to the best advantage when planted as single specimens. They make indifferent shrubbery trees. In many parts of the country Laricio nigricans (austriaca) has been associated with other trees in plantations, and its scragginess is always pronounced. Bold groups of three, five, or even seven are quite permissible and effective, but the Pines, as indeed all the taller Conifers, impart a certain sombreness to the landscape that may be easily overdone.

Economic Products.—In addition to timber, which is a characteristic product of the order, turpentine, tar, and resins are obtained from a number of species. Russian turpentine is furnished by sylvestris, also tar by a process of dry distillation. Black pitch is the residuum in the still after tar has been distilled; it is chiefly made in Russia. The leaves of Laricio are used for stuffing cushions, being first made into "Pine wool"; the oil from these leaves is used in the manufacture of soap. Longifolia gives wood, oil, turpentine, and resin, and australis is a great turpentine yielder. The turpentine is obtained by tapping the trees, and resin (commonly called rosin) is left after the oil of turpentine distilled from the crude turpentine has itself been distilled. The seeds of Pinea, the Stone Pine, are edible, and are commonly on sale in Lisbon markets; they are usually strung together.

Propagation.—By seed sown in spring, as for Piceas (which *see*). Frequent transplanting, especially with Pinaster, is necessary before they are transferred to their permanent quarters, otherwise there will be an absence of fibrous roots, and many deaths will occur. Grafting upon stocks of the respective types is practised for varieties that will not come true from seed.

Fungoid and Insect Pests.—The Pines are the prey of almost innumerable enemies, both insect and fungoid. Fungi are especially destructive. Polyporus mollis and P. borealis attack the Scotch Fir. Annosus is, however, even more dangerous than either. It attacks the roots, setting up what is commonly known as Red Rot, paralyses root action, and the death of the tree ultimately follows. If roots of affected trees are examined they will be found overgrown with the mycelium, and the fruit is usually closely fixed to the roots. Trametes, an allied fungus, also causes Red Rot; and Pini, which occasionally is found on other Conifers, often gives

trouble on the Continent; in Britain it is comparatively rare. Agaricus melleus is a common foe and attacks the Pines. Peridermium Pini occurs upon both branches and leaves, but while the branches suffer severely the leaves do not appear to be much the worse.

The premature fall of the leaves or "needles" is brought about by the action of several species of Hysterium, of which Pinastri is common to the Scotch Fir.

RETINIA), Gall Mites (*see* PHYTOPTUS), Sawflies, and Aphides (*see* CHERMES), there are many others comparatively less common but very destructive where they are in any numbers. Pissodes Pini and notatus are small beetles which gnaw the bark from the young shoots, a flow of resin resulting. Hylobius Abietis feeds upon the bark of the young shoots of the Scotch Fir and several other Conifers; it is most destructive to young trees, and in plantations where cut down branches are allowed to lie.

Photo: Cassell & Company, Ltd.

PINUS MURICATA (*see* p. 206).

Further details concerning these fungi will be found under the names of the various genera. It may be well to point out here, however, that the methods of combating these fungi must, from the nature of the trees involved, be more preventive than curative. Spraying big specimens is out of the question. General cleanliness, the removal and destruction by fire of badly attacked or dead branches and trees, and fallen needles in the case of Hysterium, is an important item. Some authorities have recommended the cutting of trenches round the trees, outside the spread of the roots, to prevent the passage of the mycelium of root fungi through the soil from infected to healthy trees.

Equally important are efficient soil drainage and free circulation of light and air amongst the plants. Cold, stagnant soil and crowded plantations favour the production of weak growth predisposed to succumb to fungoid attacks.

Insect Enemies. — Special hints will be given under the names of the various genera of insects that attack Pines. In addition to Cockchafers, Mole Crickets, Pine Bud and Shoot Moths (*see*

The most injurious of the Moths are the Pine Beauty (Trachea piniperda), the Bordered White Moth (Fidonia piniaria), and the Carpet Moth (Thera firmaria). The larvæ of a few species of the Tortricina live between the needles of some Conifers, but as a rule they are not in sufficient numbers to do much harm. Shaking the branches of larva-infested trees and destroying the larvæ which fall is sometimes practicable, but it is only in the nursery beds and on the young plants that the various washes employed in the subjugation of insect attacks can be brought into play.

Several species of Pine-bark Beetles do injury, Hylesinus ater, H. opacus, Tomicus bidentatus and T. Laricis are a few; their larvæ burrow in the bark, and have been known to severely cripple choice specimens. H. piniperda bores into the young shoots, eating the pith therefrom, and these twigs subsequently die. As the beetles frequently lay their eggs under the bark of cut off branches, tree stumps, and brushwood, a little of this material may be utilised as a trap and, after it has been allowed to lie for a few weeks, should

be taken away and burnt. Dressing the bark with kerosene emulsion is also good.

Principal Species and Varieties :—

[NOTE.—The synonymy is that of the *Kew Hand-List*.]

bungeana, 70′ to 80′, lvs. bright grn., cones small, comparatively rare (*syn.* excortica). Lace Bark Pine.

* Cembra, 50′ to 150′, lvs. grn., striated silver, three angled, cones erect, 3″ to 4″ long, a slow grower. Swiss Stone Pine.

— aurea, grn., gold.

— pumila, 4′, lvs. and cones small, a dwarf bush.

Coulteri, 50′ to 70′, lvs. glaucous, cones very large, 12″ long, 6″ broad at base, and weighing 4 lb. to 5 lb. (*syn.* macrocarpa).

* excelsa, 60′ to 150′, habit slender, growth rapid, lvs. glaucous grn. Bhotan Pine (*see p.* 203).

— zebrina, lvs. rayed wh.

halepensis, 40′ to 50′, lvs. and branches slender, cones conical (*syns.* abchasica, maritima, persica, and Pithyusa). Jerusalem Pine.

insignis, 80′ to 100′, lvs. dark grn., slender, cones 4″ to 5″ long, or. br.; needs a sheltered position (*syns.* radiata and tuberculata of D. Don). Monterey Pine.

Laricio, 100′ to 150′, cones pale br., 2″ to 3″ long, seeds winged, of erect, rigid habit (*syn.* maritima of Aiton); many vars., each of which has numerous *syns.* Corsican Pine.

— aureo-variegata, gold, grn.

— nigricans, better known in gardens as austriaca, 75′ to 110′, lvs. dark grn., rigid, cones 2″ to 3″ long, red br. (*syns.* austriaca, calabrica, dalmatica, Pinaster of Beissner, sylvestris of Baung, not Linnæus, and taurica). Black Pine.

— pallasiana, 60′ to 80′, (*syns.* caramanica, halepensis of Bieb., karamana, maritima, and Pinea of Habl.).

— pendula, weeping habit.

— pygmæa, a dwarf bush.

— tenuifolia, lvs. narrow, thin.

— variegata, grn., wh.

Pinaster, 60′ to 80′, lvs. dark grn., cones 4″ long, in clusters, a beautiful tree a few miles from the sea (*syns.* helenica, Laricio of Santi, Latteri, maritima of Poir, and nepalensis). Cluster Pine.

— Hamiltonii, lvs. shorter and paler grn. Lord Aberdeen's Pine.

— variegata, lvs. yel., grn.

Pinea, 50′ to 60′, lvs. deep grn., very stiff, seeds large, sold as a fruit in Italy, tender, likes a sandy soil near the sea. Parasol or Stone Pine.

ponderosa, 100′ to 150′, lvs. glaucous grn., cones ovoid, 3″ to 6″ long, bark in plates (*syns.* benthamiana, brachyptera, and parryana of Gordon).

— pendula, weeping habit.

— Scopulorum, dwarfer, lvs. short, cones small.

sabiniana, 40′ to 60′, bluish grn., cones 7″ to 9′ long, branches horizontal, needs a sheltered position.

* Strobus, 120′ to 160′, lvs. light grn., lined silver, cones 6″ to 8″ long, cylindrical. Weymouth Pine. Many vars., the following are some of the best:

— aurea, gold, grn.

— fastigiata, of pyramidal habit.

— nana, dwarf bushy shr. with short lvs.

sylvestris, 50′ to 100′, a well-known timber tree, doing best in a peaty soil (*syns.* rubra of Miller, Mughus of Jacquinot, rigensis, and haguenensis). Scotch Fir or Pine. There are many vars.

— aurea, pale grn. in sum., yel. in win., likes a dry soil.

— fastigiata, pyramidal.

— horizontalis, branches horizontal.

— monophylla, lvs. apparently united along their whole length.

Other Species and Varieties :—

Abies of Duroi (*see* Abies pectinata).

aristata (*see* balfouriana var.).

australis (*see* palustris).

austriaca (*see* Laricio nigricans).

* Ayacahuite, 130′, lvs. glaucous grn., cones 3″ to 4″ long, erect (*syns.* Buonapartea, Dom Pedri, loudoniana, and Veitchii).

balfouriana, 40′ to 50′, lvs. light grn., rigid, cones 2½″ long, pyramidal habit. Fox Tail or Hickory Pine.

— aristata, 40′ to 50′, cones 2½″ long, pur. br.

benthamiana (*see* ponderosa).

Bolanderi (*see* contorta).

Buonapartea (*see* Ayacahuite).

californica (*see* insignis).

canariensis, 60′ to 70′, cones oblong, cylindrical, 5½″ long, comparatively tender.

caramanica (*see* Laricio pallasiana).

carpatica (*see* montana).

chihuahuana, 30′ to 50′, lvs. finely toothed, cones 1″ to 1½″ long.

clausa, 10′ to 40′, close to inops (*syn.* inops clausa).

contorta, 25′ to 30′, lvs. bright grn., cones 1½″ long, ovoid, branches twisted (*syns.* Bolanderi, Boursieri, and inops of Bong.).

— murrayana.

densiflora, 40′ to 50′, lvs. bright grn., stiff, cones 2″ long (*syns.* tabuliformis of gardens, and massoniana of gardens in part). Aureo-variegata and argenteo-variegata are gold and silver marked vars. respectively.

devoniana (*see* Montezumæ).

Dom Pedri (*see* Ayacahuite).

excelsa of Hooker (*see* Peuke).

* flexilis, 5′ to 50′, close to Cembra, but more flexible branches. White Pine.

— albicaulis, 20′ to 30′, light grn.

gerardiana, 40′ to 50′, lvs. glaucous yel., grn., cones nearly round, 4″ to 5″ long.

gordoniana (*see* Montezumæ).

inops, 15′ to 40′, young shoots glaucous, a straggling tree (*syns.* virginiana and variabilis). Jersey or Scrub Pine.

— clausa (*see* clausa).

karamana (*see* Laricio pallasiana).

Khasya, 200′, tender.

* koraiensis, 20′ to 30′, lvs. grn., silvery, cones cylindrical, habit compact.

— variegata, young lvs. yel., wh.

* lambertiana, 150′ to 300′, lvs. olive grn., cones cylindrical, 15″ to 20″ long, very hdy. Sugar Pine.

longifolia, 60′ to 100′, lvs. very long and pendulous, grh.

lophosperma (*see* torreyana).

loudoniana (*see* Ayacahuite).

macrocarpa (*see* Coulteri).

maritima (*see* halepensis).

massoniana (*see* Thunbergii).

microcarpa (*see* Larix pendula).

montana, 5′ to 15′, lvs. dark grn., cones 1½″ long, in pairs (*syn.* carpatica.

— uncinata.

Montezumæ, 40′, lvs. glaucous, three-angled, cones 4″ to 5″ long, 1¾″ broad, hdy. in South and West Britain (*syns.* devoniana, lindleyana and gordoniana).

* monticola, 75′ to 100′, close to Strobus, but has shorter and stiffer lvs.

muricata, 25′ to 120′, lvs. bright grn., cones about 3″ long, very hard (*syns.* edgariana and radiata, *see p.* 205).

murrayana (*see* contorta var.).

Nuttallii (*see* Larix occidentalis).

occidentalis, 20′ to 30′, tender, bright grn., cones 3½″ long. West Indian Pine.

palustris, 60′ to 70′, cones 7″ to 8″ long, 2½″ broad (*syn.* australis). American Pitch Pine.

parryana (*see* ponderosa).

* parviflora, 25′ to 40′, lvs. silvery on inner side, cones ovate elliptic, 2½″ to 3¼″ long.

patula, 60′ to 80′, lvs. 7″ to 9″ long, cones in clusters of three to five.

— macrocarpa, 100′, cones 6″ to 7″ long.

— stricta, dwarfer than type, cones smaller.

* Peuke, 30′ to 40′, lvs. bright grn., cones yellowish br., 3″ to 4″ long, cylindrical (*syns.* excelsa of Hooker and excelsa var. Peuke).

pinceana, 60′, cones 3″ to 3½″ long, branches weeping.

Pithyusa (*see* halepensis).

pseudo-Strobus, 90′ to 100′, lvs. glaucous, habit slender, tender.

resinosa, 70′ to 80′, lvs., yellowish grn., wood compact (*syn.* rubra). Red Pine.

rigida, 30′ to 45′, lvs. light grn., cones ovoid, makes a big head (*syn.* Loddigesii).
— serotina, lvs. and cones longer.
rubra (*see* resinosa).
Tæda, 80′, lvs. pale grn., rigid, cones 3″ to 5″ long, solitary, wood used in the United States for torches. Frankincense, Loblolly, Old-field, or Torch Pine.
Thunbergii, 70′ to 80′, lvs. dark grn. (*syns.* massoniana, Pinaster of Loudon in part, rubra, and sylvestris). Aurea and variegata are vars.
torreyana, lvs. and shoots glaucous when young, cones 4½″ to 5½″ long (*syn.* lophosperma).
tuberculata, 25′ to 40′, lvs. deep grn., three angled, cones from 4″ to 8″ long (*syns.* attenuata and californica).
uncinata (*see* montana var.).
Veitchii (*see* Ayacahuite).

* These all belong to the section Strobus; those without the asterisk belong to the section Pinaster. The section Strobus has the leaves in fives, and loose, deciduous sheaths, with comparatively softer, lighter, and less resinous wood than is found in the section Pinaster, where also the leaves are in bundles of from one to five, and the sheaths are usually persistent.

PIONEA.

The Garden Pebble Moth (Pionea forficalis) lives, in the larval stage, upon the leaves of Horseradish, Cabbages, and many Cruciferous weeds. The perfect insect is about 1″ in spread of wings, which are straw yellow, shaded brown; the body is also yellow. There are two broods of the yellowish green larvæ each year, in June and September. Hand-picking the larvæ, killing the moths, and ridding the garden of all Cruciferous weeds, are the remedies.

PIOPHILA.

The Celery Stem Fly (Piophila Apii) is occasionally troublesome, and is difficult to deal with. The yellowish white maggots tunnel, during winter and spring, into the Celery stems, their presence being betrayed by patches of rusty red hue. These maggots pupate in the stems, and the pupæ hatch in the following May. The flies are glossy black, with yellow veined wings, and a chestnut brown head. They are ⅛″ in length. The burning of affected leaf stems is the only practicable method of dealing with this pest.

PIPER. (Pepper.)

Although upwards of 600 species have been placed in this genus (*ord.* Piperaceæ), interest is centred only in a very few, more for their economic than for their decorative qualities. Betle yields the Betle Leaf of commerce, which occupies the same position in the Far East that Tobacco does in the West. Nigrum furnishes both white and black pepper, the difference between the two condiments being that to get white pepper the seeds are deprived of their outside husk. Propagation, by cuttings of semi-matured shoots, rooted in sandy soil, in a temperature varying with the character of the species, whether half-hardy, greenhouse, or stove. Soil, loam, leaf mould, and sand. The flowers are small and inconspicuous.

Principal Species:—

Betle, st. cl., flowers in catkins. Betle Pepper and Betle Leaf.
decurrens, st., lvs. metallic grn., stems grn., mottled wh., blk. (*syns.* Artanthe decurrens and magnifica).
excelsum aureo-pictum, grh., lvs. ovate-cordate, 3″ to 5″ long, grn., blotched cream, aromatic, a bush or small tree.
Futokadsura, hlf-hdy. deciduous or ev. shr., flowers grn., fruits red; close to nigrum.
metallicum, st., lvs. fleshy, round, metallic grn.
nigrum, st. cl., flowers in catkins, fruits first grn., then red, ultimately blk. Black or Common Pepper.
ornatum, st., lvs. nearly round, bright grn., pk. spotted.
porphyrophyllum, st. cl., lvs. round, heart shaped, bronze grn., spotted pk., pur. underneath (*syn.* Cissus porphyrophyllus of gardens).

Other Species:—

borneënse, st., lvs. large, dark grn., striped silver.
rubro-nodosum, st. shr., with fleshy, red, grn. stems.
rubro-venosum, st., close to ornatum, probably a var.

PIPES.

The pipes employed for heating glasshouses are made in 9′ lengths, and usually of cast iron; the inside bore is 4″. For connecting purposes, pipes with a 6″ bore are occasionally employed in large establishments. Three-inch pipes are used as mains below ground where larger pipes would be in the way.

For carrying clear water to taps, 1″ pipes are usual. They are generally of iron. Lead pipes are more lasting, but also much more expensive. Iron pipes lined with lead are coming into favour. All water pipes exposed to the action of frost should be swathed during the winter months with hay or straw bands.

Earthenware drain pipes are usually 4″ in inside diameter. (*See* Drainage.)

Rain-water pipes of galvanised iron for roofing are from 3″ to 6″ in diameter. Gutter piping is of half pipes, usually 4″ in diameter. It should be fixed to the eaves of all glasshouses, and much washing of paths would be saved. Rain water is too precious to waste, and should be stored in tanks. See that the gutter pipes are freed occasionally from rubbish. The mouths of the take-away pipes should be covered with a wire guard.

PIPINGS.

Young shoots of the current year's growth upon Carnations, Picotees, and Pinks—that is, shoots suitable for cuttings. When required they should not be more than 3″ long, and the lower leaves should be removed to bare the soft young wood. More defoliation is injurious. The pipings may be cut after flowering is over, inserted in beds of light, sandy soil, upon a shady border, covered by hand-lights, and kept close until they show signs of rooting. Watering and syringing overhead are helpful. Sixty per cent. would be a good strike.

PIPTADENIA.

An obscure genus (*ord.* Leguminosæ) of stove shrubs or trees, none of which is of any garden value.

PIPTANTHUS.

Hardy or half-hardy evergreen shrubs (*ord.* Leguminosæ) of great beauty. Propagated by seeds, by cuttings of the ripe shoots, rooted in a close, cool frame, and by layers. Soil, sandy loam in a well-drained position. Nepalensis appears to the greatest advantage when grown against and trained to a wall, as at Kew, where it flowers regularly each year.

Pimandra (*see Cyphomandra*).
Piperidge (*see Berberis*).

Principal Species and its Variety :—

nepalensis, 8′ to 10′, spr., yel. (*syn.* Baptisia nepalensis). Evergreen Laburnum.
— aureus, bark striped grn., yel.

Other Species :—

tomentosus, close to nepalensis, but clothed with silky hair.

PIPTOSPATHA.

Stove herbaceous perennials (*ord.* Aroideæ). Propagated by division of the rootstock and by seeds. Soil, loam two parts, leaf mould and peat one part each, and sand. The drainage and water supply must be liberal, and the plants revel in heat and atmospheric moisture.

Principal Species :—

Ridleyi, Je., st., spathe grn., pk. above, lvs. 6″ to 8″ long, 2″ broad, grn., yel. blotched.

Other Species :—

insignis, sum., st., spathe wh., flushed pk., lvs. 6″ long, lance shaped, grn., leathery.

PIQUERIA.

Greenhouse and hardy shrubs and herbs (*ord.* Compositæ), of no garden value.

PISCIDIA. (Fish Poison Tree, Jamaica Dogwood.)

The only species (*ord.* Leguminosæ) is a stove evergreen tree. Propagated by cuttings of half-ripened shoots in sand, in a close frame, with bottom heat. Soil, sandy loam. It has no garden value, but is of interest from the fact that in the West Indies the leaves, bark, and twigs (bruised) are thrown into the water to intoxicate fish which it is desired to catch. Hence the popular name Fish Poison Tree.

Only Species :—

Erythrina, 30′, My., st., wh., red.

PISONIA (*syn.* Calpidia, Ceodes, Columella, Pallavia, and Torrubia).

Stove and greenhouse trees and shrubs (*ord.* Nyctagineæ), some of them of sub-scandent habit; of no special garden value. Propagated by cuttings in sandy soil, in a close case, with bottom heat. Soil, loam three parts, leaf mould one part, and sand.

Principal Species :—

aculeata, 10′, Mch., grh. climbing shr., grn. West Indian Cockspur.
grandis, 10′, Mch., grh., grn. (*syn.* inermis).
obtusata, 4′, Ap., st. shr., grn.

PISTACIA.

A small genus of dwarf, hardy or half-hardy trees (*ord.* Anacardiaceæ). Lentiscus yields the drug mastic, and from Terebinthus is obtained the Chian or Cyprus turpentine. Incisions are made in the trunk, and the exuding liquor is caught. Propagation is by layers and cuttings. Soil, a deep, rather rich, sandy loam. The species undermentioned should be given the protection of a wall, and a little covering during spells of very cold weather. Even with these provisions they are not safe except in very favoured localities.

Principal Species :—

Lentiscus, 20′, spr., ev., lvs. pinnate, flowers grn. Chia is a var. with ovate, and angustifolia a var. with linear leaflets. Mastic Tree.
Terebinthus, 30′, Je., grn., with yel. anthers and crim. stigmas, lvs. red when young. Turpentine Tree.
vera, 20′, Ap., br., grn. Pistachio Nut Tree.

Other Species :—

atlantica, 40′, grn., anthers red, lvs. pinnate.

PISTIA (*syns.* Apiospermum, Limnonesis, and Zala).

The only species (*ord.* Aroideæ) is a curious and pretty little floating stove aquatic, with bright, Pea-green leaves about 2″ long. The flowers are very small, green, and quite inconspicuous. Propagation, by offsets.

Only Species :—

Stratiotes, 1″ to 3″, lvs. bright Pea grn., flowers grn., very small. Tropical Duckweed, Water Lettuce.

PISUM. (Garden Pea.)

This genus is of great importance, although it contains only two species (*ord.* Leguminosæ). Sativum is the parent of the garden Peas, which *see*. Elatius may be treated like the Lathyruses; it is of little value.

Only Species :—

elatius, Je., Sep., hdy. ann. cl., pale red, wings dark pur.
sativum, Je., Sep., hdy. ann. cl., wh. or red. There are many vars. and sub-vars. Of the former, humile (Dwarf Pea), saccharatum (Sugar Pea), and umbellatum (Crown Pea) are some of the most distinct. Cultivated or Garden Pea.

PITCAIRNIA.

A large genus (*ord.* Bromeliaceæ) of stove perennial herbs or shrubs, many of them with spiny leaves. Some of the species are of considerable beauty. All are very easy to grow, a high temperature and plenty of water while they are making growth being the chief necessities. (For other cultural details, *see* Æchmea and Billbergia.)

Principal Species :—

[Note.—All need a stove temperature, and all are perennial.]

andreana, Jy., yel., red, lvs. 16″ to 20″ long, 1″ to 1½″ broad, wh. beneath (*syn.* lepidota).
aphelandræflora, sum., shr., bright red, lvs. 6″ long, ¾″ broad (*syn.* Pepinia aphelandræflora).
corallina, spr., red, lvs. 4′ to 5′ long, 4″ broad, spinous.
fulgens, of Decaisne, My., bright red, lvs. 2′ to 3′ long, 2″ to 2½″ broad (*syn.* Decaisnei).
— of gardens (*see* karwinskiana).
jaliscana, bright red, new, not in general cultivation.
karwinskiana, Je., red, lvs. 1½′ to 2′ long, ½″ to ¾″ broad, generally unarmed (*syns.* ringens and fulgens of gardens).
muscosa, 1′, Dec., bright red, lvs. 6″ to 9″ long, wh. beneath.
nigra, vio., lvs. 9″ to 12″ long, new (*syn.* Newmannia nigra).
pungens, My., bright red, lvs. 1′ to 1½′ long, linear.
tabulæformis, bright red, lvs. in rosettes, prostrate on soil, 5″ to 6″ long, 2″ broad, spineless.
violacea, vio., lvs. long, spiny, rare.
xanthocalyx, sum., yel., lvs. 2′ to 3′ long, 1″ to 1½″ broad, wh. beneath (*syn.* flavescens).

Piratinera (*see Brosimum*).
Pircunia (*see Phytolacca*).
Pironneaua (*see Æchmea*).
Pirus (*see Pyrus*).
Pishamin, Sweet (*see Carpodinus*).
Pistol Plant (*see Pilea*).
Pistorinia (*see Cotyledon*).

Other Species, Varieties, and Hybrids :—

albiflos, Sep., wh., lvs. tufted, 1½′ to 2′ long, ½″ broad (*syn.* odorata).
alta, Aug., bright red, lvs. 2′ to 3′ long, ¾″ to 1″ broad, spiny (*syn.* Skinneri of gardens).
Altensteinii, My., wh., lvs. 2′ to 3′ long, 1½″ to 2″ broad (*syns.* undulatifolia and Puya Altensteinii).
angustifolia, Sep., red, lvs. 2′ to 3′ long, ¼″ to ½″ broad, spiny.
arcuata, car., yel., lvs. 2½′ to 3′ long, 3″ to 4″ broad (*syn.* Newmannia arcuata).
bracteata, Ap., bright red, lvs. 1½′ to 2′ long, 1″ broad.
— sulphurea, yel.
bromeliæfolia, Je., bright red, lvs. 2′ to 3′ long, ½″ to ¾″ broad, wh. beneath.
— platyphylla, lvs. broad.
cernua (*see* heterophylla).
cinnabarina, Je., red, lvs. 1½′ long, ½″ broad.
corcovadensis, 1′, red, lvs. 3′ to 4′ long.
Decaisnei (*see* fulgens of Decaisne).
echinata, 5′ to 6′, sum., yel., red, lvs. 2′ to 3′ long, 1½″ broad.
excelsa (*see* pulverulenta).
exscapa (*see* heterophylla).
ferruginea, 6′ to 10′, Aug., wh., lvs. 2′ to 3′ long. 1½″ to 2″ broad, largest member of genus (*syn.* Puya grandiflora).
flammea, Nov., red, lvs. 2′ to 2½′ long, 1″ to 1½″ broad, wh. beneath (*syn.* Olfersii).
flavescens (*see* xanthocalyx).
floccosa, bl., lvs. in rosettes, 2½′ to 3′ long, 1½″ broad, spiny.
funckiana, My., wh., yel. grn., lvs. 2′ to 3′ long, 1″ to 1½″ broad, spinous (*syn.* macrocalyx).
furfuracea (*see* latifolia).
heterophylla, My., wh. or red, lvs. 1′ to 2′ long, linear (*syns.* cernua, exscapa, and Morrenii).
imbricata, Oct., wh., tipped grn., lvs. 1½′ to 2′ long, spinous.
Klabochorum (*see* pulverulenta).
latifolia, Aug., red, lvs. 2′ to 3′ long, linear (*syn.* furfuracea).
Lehmannii, bright red, lvs. 2′ to 3′ long, 1″ broad, spinous.
lepidota (*see* andreana).
longifolia of Hooker (*see* pulverulenta).
macrocalyx (*see* funckiana).
maidifolia, My., grn., wh., lvs. 2′ to 3′ long, 1½″ to 2″ broad, spineless (*syn.* zeifolia).
Maroni, hybrid (corallina × Altensteinii).
moritziana, sum., red or reddish yel., lvs. 1′ to 1½′ long, 1″ broad.
Morrenii (see heterophylla).
odorata (*see* albiflos).
Olfersii (*see* flammea).
paniculata (*see* pulverulenta).
pulverulenta, 6′ to 12′, Dec., bright red, lvs. 3′ to 4′ long, 1½″ to 2″ broad (*syns.* longifolia of Hooker, and Klabochorum).
punicea, sum., bright red, lvs. 1′ long, ½″ broad, wh. beneath (*syn.* Pepinia punicea).
recurvata, Ap., wh., lvs. 2′ long, ½″ to 1½″ broad, wh. beneath.
ringens (*see* karwinskiana).
Roezlii, Nov., coral red, lvs. long, stems red.
Skinneri (*see* alta).
staminea, Jan., bright red, lvs. 1′ to 2′ long, ¼″ to ½″ broad, tufted.
sulphurea (*see* bracteata var.).
undulata, Jy., bright red, lvs. 1′ long, 4″ to 5″ broad, wh. at back (*syn.* speciosissima of gardens).
undulatifolia (*see* Altensteinii).
zeifolia (*see* maidifolia).

PITHECOCTENIUM. (Monkey's Comb.)

Climbing shrubs (*ord.* Bignoniaceæ) from tropical America. They may be grown in the same way as the tropical Bignonias. Few species are in cultivation ; clematideum is about the best, although it is still a stranger to the majority of gardeners.

Principal Species :—

Catharinæ, 10′, My., wh., flushed yel., very fragrant, plant of slender growth (*syns.* Carolinæ and Bignonia Carolinæ of *Botanical Register* 1844, 54).
clematideum, wh., with yel. throat, very large and showy (*syn.* Anemopægma clematideum).

Other Species :—

buccinatorium (now Bignonia buccinatoria).
Carolinæ (*see* Catharinæ).

PITHECOLOBIUM. (Curl Brush Bean and Monkey's Earring.)

A large genus (*ord.* Leguminosæ), very few members of which appeal to the gardener. Propagation, by cuttings of the young shoots, taken either in spring or summer, and rooted in sandy peat, under a bell-glass, with bottom heat. Soil, loam and sandy peat in equal parts. Firm potting.

Principal Species :—

pruinosum, grh., wh., lvs. bipinnate, branches, foliage, and flowers covered with a rusty pubescence ; a handsome tree.

PITS.

These are distinct from other houses by reason of their smaller size, and are distinguished from frames both by their size and the fact that they are built usually upon walls. Pits are of various makes and shapes. Their roofs may be either span, half-span, hip-roof, or lean-to. With regard to position, they are governed by the same rules as those relating to larger houses, *e.g.* the span should run north and south, and the hip or three-quarter span and lean-to east and west. The majority of them should be where they can get plenty of sun, but a pit facing north is of value ; in it flowering plants can be retarded and bulbous plants stored until the period of growth comes round again ; also, where the bottom is an ash bed, Cinerarias and Primulas do well in a north pit during the summer.

It is a common plan to erect rows of lean-to pits against the supporting walls of the larger houses. This method precludes the necessity for putting any piping in the pits, for, unless a high temperature is wanted, the frost may be easily kept out by having a few apertures in the common wall, which apertures may be closed by ordinary wooden shutters. In these pits the lights should lift up at the front, two pegs in the sides, right at the back, and fitting into slots, acting as a hinge.

The larger pits may be divided into two sections —those simply standing upon the ground, and those sunk below the surface. It is common to see pits with the centre walk 3′ below the soil surface, and in that case the plunging beds are very little above the surrounding level. Such pits are economical of heat, and are suitable for early or hard forcing. They are not good if intended as cool houses, for damp rages in them during autumn and winter.

Melon and Cucumber pits may be taken as the type used for forcing. They are built with a central walk 2½′ to 3′ wide, a bed on one side from 3′ to 6′ wide, and on the other side a bed 2′ to 4′ wide. The gross width may be from 9′ to 13′.

It is advisable that all independent pits should be heated, as their usefulness is thus increased. For early forcing, enough piping should be fixed to keep up a winter night temperature of 60°. In such houses bulbs and forcing material generally do well. Figs and Vines in pots are included. For propagating purposes such houses are valuable, and also as plant hospitals. For the latter purpose

Pitcher Plants (*see Nepenthes and Sarracenia*).
Pitch Pine (*see Pinus australis, P. palustris, and P. rigida*).
Pitch Tree, Burgundy (*see Picea excelsa*).

the beds may be filled to within 1′ of the top with coke, then a little straw, and the remainder Cocoanut fibre refuse.

Forcing pits must be given a cleansing yearly; glass and woodwork should be washed—the glass with clear, not soapy, water—and the walls may be scraped and limewashed. Melon and Cucumber pits should have flowers of sulphur burnt in them after each crop, to obviate possible attacks of red spider. Where such houses form part of a range, damp sacks must be hung before the doors, and all other apertures carefully closed, to prevent the escape of the sulphur fumes. It will be well also to remove all plants from the houses immediately adjoining, and throw open their ventilators until all trace of sulphur smell has gone. Pits need painting more frequently than other plant houses —every third year is advisable.

PITTOSPORUM.

Description.—Greenhouse or half-hardy shrubs or small trees (*ord.* Pittosporeæ), for the most part with fragrant flowers in sub-umbels or panicles. As conservatory subjects they have much to recommend them. The best results are obtained from plants grown in prepared borders. The half-hardy species will do out of doors in the southern and south-western parts of Britain, but it will be well to give them the shelter of a wall in all cases. Tobira is a great favourite with Paris nurserymen, for its fragrant blooms find a ready sale in the flower markets.

Propagation.—By cuttings of semi-matured shoots, which root quickly in sandy soil, under a bell-glass, in a close, but not warm, frame.

Soil.—For the outdoor plants, a good, sandy loam; for pot plants, two parts loam, and one part leaf mould or peat, with sand.

Principal Species :—

crassifolium, 4′ to 10′, Ap., hlf-hdy., chocolate pur. Parchment Bark.
eriocarpum, dwarf, grh., golden yel., very fragrant.
phyllyræoides, grh. shr., flowers yel., ½″ across (*syn.* angustifolium).
rhytidocarpum, grh. shr., wh., in crowded umbels.
Tobira, 12′, Mch., Aug., hlf-hdy. shr., wh., fragrant. There is a variegated var.
undulatum, 10′, Feb., Je., hlf-hdy. shr., wh., numerous.
viridiflorum, 6′, My., grh. shr., greenish yel., Jasmine-scented (*syn.* sinense).

Other Species :—

coriaceum, 8′, My., grh. shr., bluish wh.
cornifolium, 2′ to 4′, My., hlf-hdy. shr., dull red.
elegans (*see* eugenioides).
eugenioides, 20′ to 30′, grh. tree, greenish wh., fragrant (*syns.* elegans and microcarpum).
— variegatum, wh., grn.
ferrugineum, 50′ to 60′, Ap., Jy., grh., yel.
microcarpum (*see* eugenioides).
revolutum, 4′ to 6′, Feb., Ap., grh. shr., yel. (*syn.* fulvum).
sinense (*see* viridiflorum).

PLACEA.

Choice and beautiful greenhouse bulbs (*ord.* Amaryllideæ), all from Chili, and closely related to the Narcissus. The plants are not commonly grown, a certain difficulty in getting them to thrive militating against them. Propagation is by seeds and offsets. Soil, light and rich; Herr Max Leichtlin has obtained excellent results from a compost of thoroughly rotted cow manure three parts, and sand one part. The plants much dislike being cramped for root room. They are at rest from August until the beginning of December, when they begin to push up growth, ultimately flowering, if the bulbs are strong enough, in May. Plenty of water is needed when the roots are active; little or none when they are at rest.

Principal Species :—

Arzæ, 9″ to 12″, yel., pur., bulb 2½″ across.
grandiflora, wh., striped bright crim., the largest of all.
ornata, 8″ to 9″, pure wh., lined vermilion.

PLAGIANTHUS. (Cotton Tree, Ribbon Tree.)

A small genus of greenhouse and half-hardy shrubs and herbs (*ord.* Malvaceæ). Propagation is by cuttings for the shrubs, and by root division for the herbs. Soil, loam two parts, leaf mould one part, and sand.

Principal Species and Varieties :—

Lyallii, 20′, sum., hlf-hdy., wh.
sidoides, 4′, sum., grh., wh.
— Lampenii, 6′ to 8′, Nov., Feb., grh., pale yel.; a great improvement on the type (*syn.* Lampenii).

Other Species :—

betulinus, 40′ to 70′, sum., hdy. on walls, wh.
divaricatus, 8′, Je., grh., wh.; found in salt marshes.
pulchellus, sum., tree, wh., very small (*syn.* Sida pulchella).

PLAGIOLIRION.

A handsome bulbous plant, with white flowers (*ord.* Amaryllideæ). It may be grown with the Eucharises (which *see*).

Only Species :—

Horsmannii, Je., Jy., st., wh., small, ten to twelve to an umbel, bulb long-necked.

PLANE (*see* PLATANUS).

PLANTAGO. (Plantain.)

As cultivated plants the Plantagos (*ord.* Plantagineæ) are worthless. Propagated by seed and division. Soil, common garden. Lanceolata, the Ribwort Plantain, and major, are often very troublesome upon lawns and cricket grounds. Where they are numerous there is nothing for it but to "spud" them up, taking care to remove as much of the long, fleshy roots as possible. Dipping a sharp iron skewer into vitriol and thrusting it into the heart of the plant is an excellent method of extermination. In all cases the places they occupied should be filled up with fresh soil, and grass seed sown. The seeds of major are an excellent food for song birds in captivity, and the spikes are commonly collected for the purpose.

Principal Exotic Species :—

coriacea, 1′, sum., st., wh., in a tall spike (*syn.* brasiliensis).

PLANTAIN.

The common Plantain (Plantago major, *see* Plantago). The Plantain of the Tropics is Musa paradisiaca (*see* Musa). The name Plantain Tree

Pityrosperma (*see Cimicifuga*).

Pladera (*see Canscora*).
Plagiolobium (*see Hovea*).
Planera of Giseke (*see Costus*).
Planer Tree (*see Planera*).
Plane Tree, Scotch (*see Acer Pseudo-platanus*)
Plank Plant (*Bossiæa scolopendria*).
Plantia (*see Hexaglottis*).

is sometimes applied to Musa generally, while the Plantain Tree of Mauritius is M. rosacea. (For Plantain Lily, *see* FUNKIA.)

PLANT BUGS.

Insects belonging to Heteroptera, a sub-order of Hemiptera. They are allied to the Aphides, Grape Lice, and Scale Insects, which are placed in sub-order Homoptera. There is this difference between these two sub-families: the Homoptera comprise a number of destructive insects, while the members of Heteroptera, or true Plant Bugs, do comparatively little damage. Many of the species are more or less parasitic. The hind wings are membranous in texture, and folded under the front wings. The latter have the tips membranous, but leathery in the lower half. Where plant bugs are destructive, kerosene emulsion (*see* INSECTICIDES) should be used.

PLANTING.

Most deciduous trees and shrubs may be planted as soon as their leaves have fallen; in fact, where they have only to be transplanted from one situation to another in the same garden it is not necessary to wait until the leaves are all off. The end of October is the best time for planting operations, providing the weather be fine, for the soil is still warm, and there is usually enough moisture in the soil to favour the production of fibrous roots. Thus plants have a chance to establish themselves to some extent before winter sets in.

Planting may be done from the end of October, weather permitting, until the end of March, for deciduous subjects. December and early January form the worst portion of the planting season, as the temperature of the soil is low. If the planting cannot be done in autumn it will be well to wait until the end of January; later if possible. Evergreens should be planted much later in the spring. Hollies transplant best in April and early May, just when new growth is starting; or in September. It is very necessary to see that the roots are covered with a ball of soil. Bamboos are best planted in May.

Fruit trees should not be handled much after the buds swell freely, as the buds are knocked off, and the young growth also receives a severe check.

Planting must not be conducted when the soil is wet and sticky. The holes should be at least 2′ wider than the diameter of the balls they are to receive. Many trees have been killed by the pernicious practice of digging deep and narrow holes in heavy soils. These pits act as water traps. A year or two under such conditions is enough to kill the plants. It will be well to break up the soil at the bottom of the hole, and when filling in to break up the sides of the hole, so as to make sure that a water trap has not been formed. Late-planted trees and evergreens in growth should always be watered in.

The soil should be made firm, the roots having been spread out in the hole at their natural level, the bruised or broken parts having been neatly cut out and covered with soil gradually, not dumped in as a mass, and then what staking is required should be done. In driving the stakes, take care not to injure any of the principal roots; it is a capital plan to insert the stakes before the hole is filled. A 2″ mulching of decayed dung may be spread round the tree to a distance equal to the spread of the roots.

PLASHING.

If neglected for pruning, Thorn and other hedges have a tendency to become bare and gappy at the base. This may be remedied, to some extent, by the operation known as plashing. Some of the smaller growths are cut halfway through at the base, bent down, and twined in and out amongst upright stakes standing at 3′ intervals. These stakes may be either living or dead—living when strong, upright growths in the hedge are made use of, and headed back to the required height. The effect of plashing is to strengthen the hedge, for the shoots grow freely and the wounds soon heal. Plashing finds its greatest development in rural districts where copses and preserves are enclosed with the usual ditch, bank, and hedge.

PLASMODIOPHORA (*see* CABBAGE CLUB-ROOT).

PLATANUS. (PLANE TREE.)

Description.—A small genus (*ord.* Platanaceæ) of the first importance to planters. As park trees Planes are well known and appreciated, but as subjects for town planting they are of even more value, possessing great smoke-resisting qualities. The Plane will grow in almost any soil, and, although it suffers in periods of drought from attacks of red spider and premature falling of the leaves, it is not so great a sufferer as the Lime. It is naturally of symmetrical habit, and by a little cutting annually can be kept within bounds for many years. Its peculiar habit of shedding its bark, and the curious, pendent, burr-like fruits which hang on all the winter, are attractive in themselves. Orientalis, the Oriental Plane, exhibits a considerable range in the cutting of the leaf, and there are many beautiful varieties. The London Plane, acerifolia, formerly regarded as a variety of orientalis, is the form most commonly planted in London and other cities, and it possesses smoke-resisting qualities in the highest degree.

Propagation.—By seeds and layers. The former should be gathered in autumn, kept through the winter, and sown in spring, in a moist and shady place, in drills 1′ apart. The hard fruits will require to be broken. Layers are rather more expeditious. A shift every two years until the plants are six or seven years old will be needed to encourage the production of fibrous roots.

Soil.—Deep, rich, rather loose soil—that of alluvial origin is excellent. The roots should have free access to water.

Principal Species and Varieties:—

[NOTE.—The synonymy here is that of the *Kew Hand-List*.]

acerifolia, lvs. Maple shaped, Ap., yel., flowers grn., peduncles bearing more than one fruit. (Many *syns.*, including algeriensis, californica, integrifolia, and intermedia of gardens, and occidentalis of Watson, orientalis acerifolia and vulgaris acerifolia.) London Plane.

— Süttneri, lvs. deeply cut, pale grn., marbled wh., vigorous (*syn.* occidentalis Süttneri).

occidentalis, 70′ to 80′, My., grn., fruits ripe in Oct. and Nov., lvs. five-angled, not deeply lobed (*syn.* vulgaris, var. angulosa). Button Wood, Western Plane.

— argenteo-variegatis, grn., golden, one of the best variegated vars.

orientalis, 60′ to 80′, Ap., flowers grn., yel., fruits br., ripe in Oct., lvs.

Platanthera (*see Habenaria*).

deeply five-lobed (*syns.* heterophylla, liquidambarifolia, and vitifolia of gardens, and vulgaris of Spach). Eastern or Common Plane.
— laciniata, lvs. deeply cut.
— variegata, lvs. grn., wh.

Other Species :—

cuneata, base of lvs. wedge shaped, otherwise like orientalis (*syns.* digitata, nepalensis, orientalis cuneata, and palmata superba).

PLATYCARPUM.

A tall, stove tree (*ord.* Rubiaceæ). Propagation, by cuttings of partly ripened shoots, in sand, in a close frame. Soil, loam two parts, leaf mould one part, and one-sixth sand. A rather dry time during winter is advisable.

Only Species :—

orinocense, 20′, st., pale ro., funnel shaped, showy.

PLATYCARYA (*syn.* FORTUNÆA).

The only species (*ord.* Juglandeæ) is a branching shrub of elegant habit, hardy in the south and south-west of Britain. Almost any soil will do for it. (*See also* JUGLANS.)

Only Species :—

strobilacea, Aug., hdy. or hlf-hdy., yel., lvs. aromatic (*syn.* Fortunæa chinensis).

PLATYCERIUM. (STAG'S and ELK'S HORN FERNS.)

Description.—These distinct-looking Ferns (*ord.* Filices) are popular and easy to grow.

Propagation.—With the exception of grande, all Platyceriums produce upon their roots buds which give rise to young plants. This is a comparatively slow method of increase. Also by spores, though sporelings take a long time before they make plants.

Compost.—The plants may be grown in shallow pots or pans, but they appear to better advantage if their epiphytic nature be taken into account and they be established on rustic tree branches or placed in pockets of virgin cork affixed to tree stems. A stump of this kind covered with Platyceriums and Ficus stipulata (repens) is a choice addition to the warm fernery. Very little soil is required—fibrous peat and chopped sphagnum in equal parts, with a little sand, charcoal, and crushed crocks added, suit them well. If grown in pots, nearly half the pot must be filled with drainage. A surfacing of living sphagnum is helpful. Weak liquid cow manure may be given in the summer months. The roots must be kept moist at all times. A fungus occasionally attacks Platyceriums, and is very difficult to deal with. Watering with weak Condy's Fluid is a good remedy.

Principal Species and Varieties :—

[NOTE.—The dimensions given refer to the fertile fronds. The sterile fronds appear as broad, flat, or slightly convex plates covering the surface on which they are growing. The edges are upturned, but are erect in grande.]

æthiopicum, 2′ to 3′ long, twice divided, subpendent, lower surface downy, st. (*syn.* Stemmaria).
alcicorne, 2′ to 3′ long, twice or thrice forked, very leathery, under surface downy, st. or grh. Common Elk's Horn Fern (*see* figure).
— Hillii, 1½′ long, erect, covered with wh. hairs when young, dark grn., fronds much forked, st. (*syn.* Hillii).
— majus, larger fronds, st.; stronger plant.
grande, 4′ to 6′ long, subpendent, in pairs, st.; one of the best.
Wallichii, fertile fronds in pairs, pendent, covered yel., woolly beneath, st.; rare, but handsome.
Willinckii, 2½′ long, in threes, pendent, much divided, glaucous, st.

Other Species :—

angolense, 9″ broad at top, not forked, st. (*syn.* æthiopicum angolense).
biforme, 6′ to 15′ long, drooping, much divided, st.; rare in cultivation.
Hillii (*see* alcicorne var.).
Stemmaria (*see* æthiopicum).
Veitchii, fronds erect, stout, leathery, dark grn., st.

PLATYCERIUM ALCICORNE.

PLATYCLINIS (*syn.* DENDROCHILUM).

Stove and intermediate house epiphytal Orchids (*ord.* Orchidaceæ), with small flowers whose number makes up for the lack of size; they are generally deliciously scented. Propagation is by division and imported pieces. Compost, fibrous peat and sphagnum in equal parts. The pans must be well drained, and hung close up to the glass, for abundance of diffused light is needed. The most suitable time for repotting is just when new growths are beginning to send out roots in spring, and where a good effect is desired it will be well to compound two or three clumps to form a large one. Plenty of water is needed during growth, but when the plants show signs of going to rest this must be curtailed; when rest is complete, give only enough to keep the pseudo-bulbs from shrivelling.

Principal Species and Varieties :—

[NOTE.—p. b. = pseudo-bulbs; l. = lip.]

cobbiana, p. b. 1″ to 2″, late aut., st., yel., l. or. yel. (*syn.* Dendrochilum cobbianum).

Platycapnos (*see Fumaria*).
Platychilum (*see Hovea*).

filiformis, p. b. 1″, sum., st., canary yel., fragrant (*syn.* Dendrochilum filiforme).
glumacea, p. b. 1″ to 2″, spr., intermediate, yel., wh., new mown hay scented; best of all (*syn.* Dendrochilum glumaceum).
— valida, stronger grower than type.
uncata, smaller than filiformis, wm., st., grn., very small (*syn.* Dendrochilum uncatum).

PLATYCODON.

A handsome, hardy perennial (*ord.* Campanulaceæ). It is closely allied to the hardy Campanulas proper, and as such may be treated.

Only Species and its Varieties :—

grandiflorum, 6″ to 12″, Jy., hdy., bl., flowers solitary or two or three at the tips of the branches. There are both pale bl., wh., and single and semi-double flowered vars. in existence; autumnale and chinense are vigorous vars., and Mariesii, with its wh. form, is of dwarfer stature and has larger flowers than the type. Chinese Bell-flower or Balloon Flower.

PLATYCRATER.

Arguta is the only known species of this genus (*ord.* Saxifrageæ). It is a hardy, dwarf shrub, bearing greenish white flowers in summer. Propagation, by cuttings in summer. Ordinary garden soil.

PLATYLOBIUM. (Flat Pea.)

A genus of Australian shrubs (*ord.* Leguminosæ) not in general cultivation. Propagation, by seeds sown in early spring, or by cuttings of short, half-ripe shoots inserted firmly in pots of sandy peat, in a close frame in July. Soil, fibrous peat and silver sand. Potting should always be done firmly, and large shifts must be avoided. A cool, airy greenhouse or light frame from which frost is excluded is necessary, and, if desired, plants may be stood out of doors for the summer.

Principal Species :—

formosum, 4′, Jy., yel.
gracile, 3′ to 4′, Je., yel.
obtusangulum, 1′, My., yel., red.
triangulare, 1′, My., yel.

Other Species :—

alternifolium, 3′ to 4′, Je., yel.
aphyllum, 3′, My., yel.

PLATYLOPHUS.

A genus of one species (*ord.* Saxifrageæ). Trifoliatus is a graceful, evergreen, greenhouse tree, with ternate leaves and large heads of white flowers in June. Propagated by cuttings of half-ripe shoots. Soil, fibrous loam and peat. Although usually seen as a bush, it grows 40′ high.

PLATYSTEMON.

A pretty, hardy annual (*ord.* Papaveraceæ), known sometimes as the Californian Poppy, which grows in common soil if treated like the annual Papavers, or Poppies.

Only Species :—

californicus, 1′, Jy., yel.

PLATYSTIGMA.

Half-hardy annual herbs (*ord.* Papaveraceæ), with narrow leaves and yellow flowers. Seeds should be sown out of doors in April in places where the plants are intended to flower, thinning the seedlings when necessary.

Platyloma (*see Pellæa*).

Principal Species :—

californicum, 1′, sum., yel.
lineare, 1′, sum., yel.
oreganum, 1′, sum., yel.

PLATYTHECA.

Galioides is the only known species of this Australian, Heath-like genus (*ord.* Tremandreæ). It grows 1′ to 2′ in height, and bears pale blue flowers during late spring. Propagation, by cuttings of half-ripe shoots in July, treated like those of tender Ericas. Sandy peat and careful watering are essentials to success.

PLEASURE GROUND.

The pleasure ground includes the flower gardens, lawns, shrubberies, and other portions of the grounds which are mainly of an ornamental character. The size and style of the grounds attached to a house ought to be proportionate to the building and to the means of its owner. In a large establishment they should be extensive and varied in character, embracing flower gardens, conservatories, tennis and other lawns, shrubberies, and wooded park, with wild garden, rock garden, ponds or lakes, and fountains. A pleasing diversity should characterise the whole, but there ought to be no sudden or jarring transitions from the formal to the natural parts. In the smaller establishment, a proportionate extent of pleasure ground is pleasing, and a simpler style of plan and treatment ought to prevail. For the several features of the pleasure ground, consult this work under their respective titles.

PLECTOCOMIA.

Stove Palms (*ord.* Palmæ) of climbing habit, allied to Calamus. They are distinguished by long, elegant, pinnate leaves, each of which is terminated by a long, whip-like appendage armed with stout spines. Propagation, by imported seeds. Soil, rich loam.

Principal Species :—

assamica, 80′, lvs. arching.
elongata, 100′ to 150′, lvs. long, semi-pendent.
Griffithii, 60′, flowers yel.
spectabilis, 80′, very ornamental.

PLECTRANTHUS.

Coleus-like herbs or sub-shrubs (*ord.* Labiatæ) of no horticultural value. Propagation, by cuttings. (*See* Coleus.)

Principal Species :—

fœtidus, 2′ to 5′, sum. or win., pur.
fruticosus, 3′, sum., pur.
hadiensis, 3′, sum., lil., pur.
purpuratus, 3′, sum., pur.
ternatus, 9″, Aug., pur. Opine Plant.

PLECTRONIA.

A large number of species (*ord.* Rubiaceæ) are known, but very few are in cultivation, and these are of no horticultural value.

PLEIONE. (Indian Crocus.)

Botanists include Pleione under Cœlogyne, of which genus it forms a deciduous section. Pleiones are of low growth, with curious, annual pseudo-bulbs. The beautiful, short-stemmed flowers are about 3″ across, produced singly or in pairs from the base of the old pseudo-bulb after the leaves

Platypetalum (*see Braya*).
Platysma (*see Podochilus*).
Platystachys (*see Tillandsia*).
Plectrites (*see Valerianella*).

have fallen, and are seldom raised more than 3″ above the soil. Propagation, by division at potting time. Soil, fibrous peat, sphagnum, and silver sand; or leaf mould in place of peat. Rather deep pans are the best receptacles if ample drainage is provided. Potting is best done soon after flowering. Place the bulbs 2″ apart, and wrap a little sphagnum round the base of each to help fix it in the compost. Give a light and elevated position in an intermediate house until summer, when a cool house will suit. After the first watering no moisture will be needed for several weeks, in fact, till growth is active; reduce the supply when the leaves begin to turn yellow, and withhold it when they fall. Keep dry till growth starts again

Pleione (*correctly* Cœlogyne) lagenaria.

Principal Species :—

[Note.—s. = sepals. p. = petals. l. = lip.]

humilis, 6″ to 9″, win., s. and p. pale blush., l. blush, pur.

lagenaria, 6″ to 12″, win., s. and p. rosy lil., l. wh., marked pur., yel., crim. (*see* figure).

maculata, 6″ to 10″, aut., s. and p. wh., l. wh., pur., disk yellowish pur.

præcox, 8″ to 14″, win., s. and p. rosy pur., l. pale ro., disk yel.; wallichiana has larger and darker flowers.

Other Species :—

birmanica, 8″ to 12″, win., s. and p. rosy pur., l. pur., disk wh., br.

hookeriana, lvs. 4″ to 8″, produced with the flowers, spr., s. and p. rosy pur., l. light pur. marked dark pur., throat yel.

reichenbachiana, 6″ to 12″, win., s. lil. marked pur., p. lil., l. wh., spotted pur.

wallichiana (*see* præcox var.).

PLERANDRA.

Stove evergreen trees (*ord.* Araliaceæ) requiring loamy soil. Not of great horticultural value.

Principal Species :—

Grayi, 20′ to 30′, Jy., grn. (*syn.* Græffei).

vitiensis, 10′, sum., grn.

PLEROMA.

By botanists this genus (*ord.* Melastomaceæ) is mostly included in Tibouchina, but some of the species are so well known under the old name that it is included here. All are evergreen shrubs requiring an intermediate temperature. Propagation, by cuttings in a close case. Soil, two parts fibrous peat, two parts loam, and one part sand

Principal Species :—

elegans, 5′, sum., bl. (now Tibouchina elegans).

macranthum, 8′, win., sum., vio. pur. (now Tibouchina semi-decandra).

— floribundum, 4′, dwarf, 6″ across.

PLEUROGYNA (*syn.* Lomatogonium).

A hardy annual (*ord.* Gentianeæ) of no horticultural value.

PLEUROPETALUM.

Curious, warm greenhouse shrubs from Central America (*ord.* Portulaceæ). Propagation, by cuttings of young shoots in a close case. Soil, rich loam.

Principal Species :—

costaricense, 4′, Aug., grn., turning to red.

Darwinii, 3′, Aug., grn., red.

PLEUROSPERMUM.

Hardy perennial herbs (*ord.* Umbelliferæ) of no value horticulturally.

Pleocnemia (*see Nephrodium*).
Pleopeltis (*see Polypodium*).

Pleurandra (*see Hibbertia*).
Pleuridium (*see Polpodium*).
Pleurococcus (*see Pinus enemies*).
Pleurogramma (*see Monogramme*).

PLEUROTHALLIS.

Nearly 400 species of this genus of Orchids (*ord.* Orchidaceæ) have been described. They are principally natives of the West Indies and tropical America, many of them being little better than weeds. Long, thin stems are usually made, terminated by a single thick, leathery leaf and a succession of small, often brown or yellowish flowers. Propagation, by division in spring. Compost, peat, sphagnum, and charcoal. A cool or intermediate house will suit the majority. The following are a few of the many species. All are interesting, if not very showy.

Principal Species :—

barberiana, 6′, spr., ochre, pur., wh.
Grobyi, 3″, spr. to win., yel.
insignis, 9″, sum., pur., grn., bl.
picta, 6″, sum., yel., red.
platyrachis, 6″, sum., grn., pur. spots.
polyliria, 4″, grn., wh.
prolifera, 6″, win., pur., pk.
Scapha, 9′, Jy., wh., pur. lines.

PLOCAMA.

One species only (*ord.* Rubiaceæ). Pendula is a greenhouse shrub about 2′ high, with slender, pendulous branches and white flowers. Propagation, by cuttings. Soil, peat and loam.

PLOCOGLOTTIS.

Terrestrial Orchids (*ord.* Orchidaceæ) from the Malay Peninsula, requiring to be grown in the warmest house. Propagation, by division. Compost, fibrous peat, crocks, charcoal, and sphagnum, the material being raised well above the rim of the pot.

Principal Species :—

acuminata, 10″, yel.
javanica, 8″ to 10″, yel., spotted red.
Lowii, 1½′, ochre, br.

PLUCHEA.

Greenhouse or hardy perennials (*ord.* Compositæ) of little value to the gardener. Propagation, by seeds. Ordinary garden soil.

Principal Species :—

caspica, 2′ to 3′, Aug., hdy., pur.

PLUM.

Description. — Amongst hardy fruits the Plum ranks high in importance. It is valuable for dessert and culinary purposes, for which it may be employed over an extended period; while in a dried state, as represented by Prunes, it is an important commercial commodity. For preserving in the form of jam it is probably the most popular of fruits. The present splendid varieties are said to have been derived from the wild Plum, Prunus communis, which has become naturalised in the copses and hedgerows of the British Isles.

Propagation.—By seeds, suckers, layers, buds, and grafts. The first named method is usually resorted to for the production of stocks for budding and grafting. The Mussel is best for standards, and the St. Julien for trained trees. Some Plums produce suckers abundantly, and these may be secured for stocks, but the method is not recommended, as such stocks always give more sucker growths than those from seeds. Layering is easily done by pegging down a branch after cutting partially through on the under side. Budding is the best form of increase, securing fine buds and inserting them when the bark parts freely from the branch; this is usually in July. Grafting is seldom resorted to, but whip grafting may be done in exceptional cases.

Soil and Situation.—Plums are fastidious in their likes and dislikes, and the prospective grower should ascertain what varieties flourish in his district, and plant those. A few, such as Victoria, thrive almost everywhere. A very rich soil is not desirable, as it tends to the production of wood instead of fruit. A strong, retentive loam is generally the best, but lime in some form must be present, or the results will be unsatisfactory. In all cases the drainage must be good. The situation should be open, though distant shelter is desirable for some varieties. There must, however, be no obstruction to light and air.

Planting and Pruning.—The planting of Plums goes hand in hand with the planting of all fruit trees. The station is prepared at least 2′ greater in diameter than the extreme spread of the roots, which are carefully laid out and good soil worked and made moderately firm amongst them. Stakes should always be placed in position before the planting is done. November is the best time for planting, and the growths should be cut back by at least two-thirds their length in the spring. When once the tree has been formed, the less pruning the better, as Plums resent the free use of the knife. Badly placed branches should be removed entirely, as should those having a tendency to grow over others, and thus cause obstruction to light and air.

Forms of Trees.—For orchard culture, standards are the best; for gardens, bushes and pyramids are very valuable. Cordons answer fairly, and give excellent fruits; but the best type of trained tree is the fan, the branches being at least 1′ asunder. Carefully managed, they will cover a large area and carry immense crops of fruit. Horizontal training is not usually so satisfactory with Plums as with Apples and Pears, and is not so frequently adopted.

Trees under Glass.—Plums may be very successfully grown under glass, either planted out or in pots, provided light, airy houses are at command, and no undue forcing is attempted. The trees should start naturally, and be brought on gradually. Though when planted out they thrive well, pot culture is probably the better mode of procedure, as the entire plant is then easily under the control of the grower. Plums answer admirably to the general management recommended for trees in Orchard houses (which *see*).

Selections of Varieties :—

Twenty-four in Order of Ripening :—

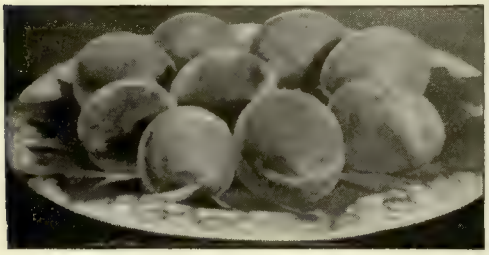
Rivers's Early Prolific.
Czar.
Oullin's Golden.
Denniston's Superb.
Early Transparent Gage.
Gisborne's.
Orleans.
Belle de Louvain.
Belgian Purple.
Green Gage.
Victoria.
Jefferson.
Bryanston Gage.
Pond's Seedling.
Transparent Gage.
White Magnum Bonum.
Kirke's.
Diamond.
Late Transparent.
Monarch.
Reine Claude de Bavay.
Ickworth Impératrice.
Grand Duke.
Coe's Golden Drop.

Plocostemma (*see Hoya*).
Plocostigma (*see Podochilus*).
Ploughman's Spikenard (*see Baccharis*).
Plowrightia (*see Gooseberry Fungi*).

Nine for Dessert :—

Denniston's Superb.	Transparent Gage.
Early Transparent Gage.	Angelina Burdett.
Green Gage.	Kirke's.
*Jefferson.	*Coe's Golden Drop.
	Reine Claude de Bavay.

* Three select varieties.



Plum Coe's Golden Drop.

Nine for Kitchen :—

*Rivers's Early Prolific.	*Monarch.
Orleans.	Cox's Emperor.
Gisborne's.	Pond's Seedling.
*Victoria.	Diamond.
	Wyedale.

* Three select varieties.

Enemies of Plums.—Gumming sometimes follows pruning, and is encouraged by over-feeding, deep, loose soil, and stagnant water at the roots. The branch attacked should be removed, and the wound dressed with any wet-excluding compound. Correct cultivation is the best, though not a sure preventive. Mildew may be arrested by dusting with sulphur, or spraying with potassium sulphide (*see* Fungicides). The Plum Aphis sometimes causes great trouble. Dressing with a petroleum mixture or the caustic soda solution (*see* Insecticides) is recommended. The larvæ of Carpocapsa funebrana, known as Red Grubs, cause the fruits to fall prematurely; these should be at once collected and burned. There are other pests, but they rarely do serious injury where the best methods of cultivation are adopted.

PLUMBAGO.

Description.—Showy, hardy herbaceous plants, or greenhouse or stove shrubs (*ord.* Plumbagineæ), several of which are among the most popular of garden plants. The indoor species are of shrubby habit, with more or less rambling branches.

Propagation.—The herbaceous species by division in autumn or spring; the indoor species by cuttings 4″ long in a close, warm propagating case, in spring.

Soil.—Ordinary garden soil for the herbaceous species; good fibrous loam and leaf mould, with sufficient silver sand to ensure porosity, for the indoor species.

Other Cultural Points.—The most popular species is capensis. It may be grown in a great variety of ways. As a pot plant, trained to stakes, a wire trellis or balloon, or planted out, it makes an excellent subject for clothing a greenhouse end, roof, or pillar. It should be spurred back annually to within a bud or two of the old wood. Rosea and its variety superba are best treated as annuals, cuttings being rooted each spring and the young plants stopped a few times to produce six or eight shoots. By growing in an intermediate temperature, nice plants in 5″ or 6″ pots may be had by autumn, to flower during winter.

Principal Species and Varieties :—

cærulea, 2′, sum., bl., slender.	europæa, 3′, Sep., hdy., bl.
capensis, 10′ to 30′, aut., bl.	purpurea (*see* europæa).
— alba, wh.	rosea, 2′, win., spr., ro.
	— superba, larger flowers.

Other Species :—

grandiflora (*see* capensis).	pulchella, 3′, sum., st., bl., vio.
Larpentæ (*see* Ceratostigma plumbaginoides).	zeylanica, 1½′, Je., st., wh.
micrantha, 2′, Jy., hdy., wh.	

PLUMERIA.

A fine but neglected genus of stove trees (*ord.* Apocynaceæ), with pretty, often fragrant, flowers in clusters at the ends of the branches. Propagation, by cuttings of ripe shoots in spring, under a hand-light, in sand, and placed in slight bottom heat. Soil, sandy loam and fibrous peat or leaf mould.

Principal Species :—

acutifolia, 20′, Je., pk., wh. (*syn.* acuminata).	lutea, 20′, Je., pk., yel.
bicolor, 15′, Jy., wh., yel.	obtusa, 10′, Jy., wh.
Jamesoni, 4′, Jy., yel., red.	rubra, 10′ to 20′, Jy., red. The Frangipani.
lambertiana, 10′, Je., wh., yel. (*syn.* Gouani).	tricolor, 15′, Jy., wh., yel., red (*syn.* Kerii).

POA. (Meadow Grass.)

A genus of hardy Grasses (*ord.* Gramineæ) of little horticultural use, though several are of agricultural value. For growing under glass the striped variety of trivialis is a useful plant. Annua is largely used in forming lawns by means of seeds instead of turfing; it is one of the best Grasses for growing beneath trees.

Principal Species and Varieties :—

annua.	nemoralis.
flabellata (*syns.* Dactylis cæspitosa and Festuca flabellata).	pratensis.
	serotina (*syn.* palustris).
	trivialis.
	— albo-vittata.

PODACHÆNIUM.

Tender shrubs (*ord.* Compositæ), requiring an intermediate temperature. Andinum, 3′, summer,

Plum, Kirke's.

white, yellow, is the best known species. It likes loamy soil, and is recommended for sub-tropical bedding.

Plumed Thistle (*see Cnicus*).
Plum, Fir (*see Prumnopitys elegans*).
Plum, Guinea (*Parinarium excelsum*).
Plum, Maiden (*see Comocladia*).
Plutella (*see Diamond-back Moth*).

PODALYRIA.

Greenhouse evergreen shrubs (*ord.* Leguminosæ), from South Africa. Propagation, by cuttings of half-ripe shoots in summer. Soil, fibrous loam and peat.

Principal Species :—

argentea, 6′, Je., wh.
buxifolia, 4′ to 6′, Je., pur.
calyptrata, 6′, Je., Jy., pur.
reticulata, 6′, Je., pur.

PODANTHUS.

Two species of greenhouse shrubs (*ord.* Compositæ). Propagation, by cuttings in sandy soil under a hand-light. Soil, peat and loam, with sand.

Only Species :—

gratus (*see* ovatifolius).
Mitiqui, 3′, sum., yel.
ovatifolius, 2′, sum., yel.

PODOCARPUS.

A genus of, principally, greenhouse evergreen trees (*ord.* Coniferæ). For large conservatories several species make useful subjects for planting out, while in places where severe frosts are not experienced the majority are useful for outdoors. Pectinata, a rare species with small green and grey leaves, makes a nice pot plant. Propagation, by seeds, or cuttings of half-ripe wood. Soil, moist loam. When planted in borders very little trouble is given, as they naturally make shapely specimens.

Principal Species :—

alpina, 10′ to 12′, hdy.
dacrydioides, 150′; timber tree.
elongata, 50′ to 120′; timber tree.
neriifolia, 60′, large-leaved.
pectinata, 12′ or more, lvs. wh., grey.
Totara, 60′ to 150′; timber tree. Totara Pine.

Other Species :—

amara, 50′, st.
andina (now Prumnopitys elegans).
chilina, 30′ to 60′.
ferruginea, 80′.
japonica, 20′ to 30′.
macrophylla, 40′ to 50′.
Nageia, 30′ to 60′.
nubigena, 60′.
purdieana, 100′ to 130′.

PODOCHILUS.

Epiphytal Orchids (*ord.* Orchidaceæ) with small leaves on long, slender stems, and terminal racemes of minute flowers. An intermediate temperature is required. Compost, fibrous peat, sphagnum, and crocks.

Principal Species :—

longicalcaratus, 2′, sum., wh., striped pur.

PODOCOCCUS.

One species only (*ord.* Palmæ). Barteri, 8′ to 10′, is a native of tropical Africa. The leaves are 5′ to 6′ long and deeply lobed. The flowers are red, followed by orange coloured, edible fruit. Propagation, by seeds or by suckers in spring. (*See also* Cocos.)

PODOLASIA.

One species only, stipitata (*ord.* Aroideæ). It grows 1½′ high, has handsome, arrow-shaped leaves and striking-looking inflorescences in spring. The latter are 4″ long, and borne on a stalk 1′ in height. The spathe is brownish red, the spadix cream. It requires stove culture, rich, loamy soil, and a long rest.

Podanthes (*see Stapelia*).
Podianthus (*see Trichopus*).
Podocytisus (*see Laburnum*).
Podolobium (*see Oxylobium*).

PODOLEPIS.

Annual or perennial herbs (*ord.* Compositæ), with alternate, lanceolate, stem-clasping leaves. The majority are hardy, but a few require greenhouse culture. Propagation, by seeds or division. Loamy soil.

Principal Species :—

acuminata, 1½′, sum., hdy. ann., yel.
aristata, 1′, sum., hdy. ann., yel., pk.
gracilis, 3′, Aug., hdy. per., pur., lil., or wh.
Lessonii, 2′, sum., hdy., yel.

PODOPHYLLUM.

Hardy or half-hardy perennial herbs (*ord.* Berberideæ). They have large, ornamental, roundish, deeply lobed leaves, white or reddish purple flowers, and red fruits. Propagation, by division or seeds. Soil, moist peat and loam in a shady position. The plants thrive by stream sides, and in marshy spots.

Principal Species :—

Emodi, 1′, My., wh.
peltatum, 6″ to 9″, My., wh.
pleianthum, 12″ to 15″, My. to Jy., reddish pur.

PODOPTERUS.

A genus (*ord.* Polygonaceæ) containing one species only. Mexicanus is a handsome greenhouse shrub, growing from 2′ to 3′ in height, bearing small, oblong leaves and tiny pink flowers in July. Propagation, by cuttings in summer. Soil, equal parts fibrous peat and loam.

PODOSTIGMA.

Pubescens (*ord.* Asclepiadeæ), a half-hardy herbaceous plant, is the only species. It has tuberous roots, grows 6″ to 12″ in height, and produces umbels of orange coloured flowers in July. Propagation, by division. Ordinary garden soil.

PODOTHECA.

A small genus (*ord.* Compositæ), allied to Gnaphalium, composed principally of hardy annuals. Very few are grown. Ordinary garden soil.

Principal Species :—

chrysantha, 1½′, sum., yel.
fuscescens, 1′ to 2′, sum., yel.
gnaphalioides, 1′ to 1½′, sum., yel.
pygmæa, 6″, sum., yel.

PŒDISCA.

Pœdisca (Ditula) angustiorana is a moth that causes damage to the leaves of Peach, Nectarine and Apricot trees in spring by causing the leaves to curl. The moth is very small, with reddish brown fore wings and dark hind wings. The female lays her eggs on the branches, where they remain during winter and hatch in May; the young caterpillars appropriate the young, tender leaves. During May and June the caterpillars are busy feeding. The perfect moth appears in July. The best remedy is to remove and burn the curled leaves in May and June.

Podoria (*see Boscia*).
Podosperma (*see Podotheca*).
Podospermum (*see Scorzonera*).
Pœcilopteris (*see Acrostichum*).

POGOGYNE.

Hardy annuals (*ord.* Labiatæ), with small, linear leaves and long spikes of lilac or bluish flowers, the flowers being produced in whorls intermixed with leafy bracts. Seeds may be sown indoors and transferred to the open border in May, or they may be sown outside in April. Any good garden soil.

Principal Species :—

Douglasii, 1′, sum., pur.
nudiuscula, 1′, sum., bl.

POGONIA.

Terrestrial Orchids (*ord.* Orchidaceæ) with small, round tubers, often ornamental foliage and white, pink, or lilac flowers. Propagation, by division at the time of potting. Compost, fibrous loam, peat and sphagnum, broken sandstone, charcoal, and crocks. Thorough drainage is essential. A minimum temperature of 50° should be given, and plenty of water whilst growth is active, drying off and resting as the leaves decay.

Principal Species :—

barklyana, 2′, sum., grn., lvs. 9″ across.
discolor, 6″, sum., grn., wh., lvs. rich br., blotched grn., under side pur.
Fordii, 1′, yel., ro. lip, lvs. large, bronzy grn., pur. beneath.
plicata, 9″, sum., grn.
speciosa, 1′, sum., pur.

POGONOPUS.

Stove trees and shrubs (*ord.* Rubiaceæ) from tropical America. Exsertus or caracasensis (*syn.* Howardia caracasensis) is the only species cultivated. It is very showy, grows 4′ to 8′ high, and produces terminal heads of pink flowers in summer. Propagation, by seeds and cuttings. Soil, light loam.

POGOSTEMON.

A genus of herbaceous or sub-shrubby plants (*ord.* Labiatæ). They are of little horticultural value.

Principal Species :—

Patchouli, 3′, Je., wh., with pur. marks. — suavis, sweet.

POINCIANA.

Evergreen trees and shrubs (*ord.* Leguminosæ), requiring stove treatment. Propagation, by seeds sown in heat in spring, or by cuttings of short side growths in very sandy soil beneath a bell-glass over bottom heat. Soil, rich, fibrous loam, with coarse sand or sharp road grit.

Principal Species :—

elata, 15′, Jy., yel.
Gilliesii (*see* Cæsalpinia Gilliesii).
pulcherrima (*see* Cæsalpinia pulcherrima).
regia, 15′ to 40′, Jy., crim.; the seed pods of this species are of remarkable length.

POINSETTIA.

Description.—The plant grown in British gardens under the name of Poinsettia pulcherrima is correctly Euphorbia pulcherrima (*ord.* Euphorbiaceæ). It is grown for its brilliant scarlet crimson bracts.

Propagation.—By lengths of the old, firm stem, inserted in sandy soil, in brisk bottom heat, in March; by side growths secured in April or May from the old plants when these have been placed in heat and encouraged to grow after a season of rest. Each cutting should have a heel of old wood and be dipped in fine sand to stop the bleeding. Thumb pots, one cutting in each, should be used, and the compost should be light, plunging the pots in brisk bottom heat. Dwarf plants in 3″ pots, with heads of bracts 15″ in diameter, can be grown for Christmas table decoration from cuttings struck in August and September. The plants must be grown without a check.

Soil.—Mellow loam three parts, decomposed leaf mould and short manure one part each, with sharp sand.

Other Cultural Points.—Care must be taken that the cuttings do not damp off, which they are prone to do unless the inner surface of the glass in the propagating case is dried each morning. After removal from the cutting pots to those 4½″ in diameter the benefit of slight bottom heat is desirable, but there must be no forcing, and the plants must be gradually hardened until after they have become established in 8″ pots; they can be placed in a frame or pit for the summer. Before the roots can possibly have become chilled they should be placed on a stage in a temperature of 55°, where they will soon commence to grow if properly watered. Weak liquid manure may be applied when the bracts are showing. The temperature may be gradually increased, but sharp fluctuations must be strenuously guarded against.

Varieties.—Besides the type there are several varieties of the Poinsettia. These are alba, creamy white bracts; major, very long and broad bracts; and plenissima, bracts more numerous.

POINTING-IN.

This technical term is applied to the business of lightly forking over the surface of a fruit tree border, or other plot full of roots, to incorporate with the soil any dressing of artificial manure or the remains of a mulching. For this work a fork is the only tool permissible, and only the upper 2″ of soil should be moved with it, so that the roots are not damaged.

POISONOUS PLANTS.

So very many plants are more or less poisonous that it would require a small volume to deal with them all, consequently only a few of the more important can here be referred to.

Among those that poison by contact the best known is the Stinging Nettle, but its effects soon pass away. Belonging to the same order are Laportea moroides and L. gigas, and if these are touched by any uncovered part of the body the effects of the poison left by the stinging hairs will be felt for days, and possibly many weeks, afterwards. The popular Primula obconica is another instance, but from this, as from some members of the Rhus family, some folk take no harm, while others are made quite ill by handling it.

Many other plants are poisonous only when eaten, and it may be the root, bark, seed, leaf, or

Poet's Cassia (*see Osyris*).
Poet's Narcissus (*see Narcissus poeticus*).
Pogospermum (*see Catopsis*).
Poiretia (*of Smith, see Hovea; of Cavanilles, see Sprengelia*).
Poison Bulb (*see Brunsvigia and Crinum asiaticum*).
Poison Elder (*see Rhus venenata*).
Poison Nut (*see Strychnos Nux-vomica*).
Poison Oak (*see Rhus Toxicodendron*).

kernel of the fruit that is the poisonous part. Among British plants the Hemlock, Fool's Parsley, White Bryony, Deadly Nightshade, Thorn Apple, Foxglove, and Monkshood are all very poisonous. The roots of the latter, much like Horseradish in appearance, almost always prove fatal to the eater; the poison is aconitine.

Vegetable poisons may be irritant, narcotic, or narcotico-irritant, chiefly the two latter. Hydrocyanic acid, formerly known as prussic acid, belongs to the second class. It can be distilled from Almond kernels, but is now generally produced chemically. Under narcotic poisons must also be included Opium and Henbane. Among irritant poisons Colocynth, Croton-oil, Elaterium, Gamboge, and Savin are the chief, while into the class of narcotico-irritants come the poisonous properties of the British plants mentioned in the preceding paragraph, as well as Tobacco, Strychnos Nux-vomica, Laburnum (bark and seeds), Yew (leaves), Hellebore, and most species of Fungi.

Many vegetable poisons are valuable medicinally when administered in small doses and in certain combinations, but in all cases their use should be left to the direction of a medical man, and their preparation to the dispenser.

POITÆA.

Dwarf-growing stove shrubs (*ord.* Leguminosæ). Propagation, by cuttings in sand over bottom heat. Soil, loam, with plenty of coarse sand.

Principal Species:—

galegoides, 1′, Je., rosy pur.

POLANISIA. (Cleome.)

Hardy annuals (*ord.* Capparideæ). Propagation, by seeds sown under glass in April and planted in any ordinary garden soil at the end of May.

Principal Species:—

Chelidonii, 1½′, Je., ro.
dodecandra, 1½′, Je., wh.
graveolens, 1½′, Je., pk.
uniglandulosa, 1½′, Je., reddish yel.
viscosa, 2′, Je., yel.

POLEMONIUM.

Description.—Pretty, hardy or half-hardy, annual or perennial herbs (*ord.* Polemoniaceæ), which make a pleasing effect in the border or rock garden. The variegated-leaved form of cœruleum is often used as an edging, for which purpose the flower buds should be pinched off as they show.

Propagation.—The perennials by division in spring or early autumn, and by seeds in spring; the annuals by seeds at the same season.

Soil.—Good rich loam for the border plants, but a lighter one for the Alpine species.

Principal Species and Varieties:—

cœruleum, 2′, Je., bl. Jacob's Ladder, Greek Valerian, Charity.
— album, wh., foliage various, lvs. grn., wh.
— campanulatum, Ap., My., bright bl.
— dissectum (*syn.* sibiricum).
confertum, 6″, sum., bl.
— melitum, wh.
flavum, 2′ to 3′, Aug., pale yel.
humile, 6″, Jy., bl.
reptans, 6″, Ap., bl.
Richardsoni, 1′, sum., pur. bl. (*syn.* humilis Richardsoni of some).

Poison Sumach (*see Rhus venenata*).
Poivrea (*see Combretum*).
Poke Weed (*see Phytolacca*).
Polar Plant (*see Silphium laciniatum*).

Other Species and Hybrid:—

flavo-cœruleum, 3′ to 4′, sum., wh., hybrid.
himalayanum, 1′, sum., lil., bl.
pauciflorum, 1½′, sum., yel., red.

POLIANTHES. (Tuberose.)

Greenhouse, bulbous plants (*ord.* Amaryllideæ). They will flower out of doors in a favoured climate provided the soil be light and sandy. Propagation, which is rarely resorted to in this country, is by offsets. Soil, mellow loam with sand. (For full cultural details, *see* Tuberose.)

Only Species and its Varieties:—

tuberosa, 3′, Aug., wh.
— flore pleno, 3′, Aug., wh.
— gracilis, 3′, Aug., yel.

POLLEN.

The male organs of a flower are the stamens and anthers; the latter are essential, but the former may be so reduced as to be practically absent. Within each anther pollen is produced by cell division, eventually becoming separate grains in the majority of flowering plants; in Orchids the grains combine to form the pollen masses. An anther does not burst until the pollen is ripe, *i.e.* in a suitable condition to cause fertilisation when applied to a receptive stigma. Pollen varies a little in colour, but is most familiar as a yellow or greenish yellow powder; in many Liliums it assumes a brownish tint, while in Scillas it is bluish. Though varying much in shape and size, pollen grains are nearly all furnished with two coats or skins, the outer (extine) and the inner (intine), the latter being very elastic. When a grain is placed upon a ripe stigma, there are openings in the outer coat, through which the inner one forms an elongated tube that grows down through the style into the ovary, conducting the most important part of the grain contents, the nucleus, through the micropyle of an ovule to the embryo.

POLLIA.

Stove herbaceous perennials (*ord.* Commelinaceæ). Propagation, by division or by seeds. Soil, loam, leaf mould, and sand.

Principal Species:—

crispata, sum., trailer, bl. (*syn.* Aneilema crispata).

POLLINATION.

The transfer of pollen from anther to stigma is known technically as pollination, and it is effected by Nature in many wonderful ways. In the majority of flowers the pollen is not ripe at the same time as the stigma is receptive, but there may be ripe pollen and receptive stigmas on the same plant and on the same inflorescence; consequently, unless by the help of wind, insect, or other outside agency, pollination cannot take place. This gives a reason for pollen distribution by artificial means, such as a dry hand, hare's or rabbit's tail, or a camel hair brush, to secure a good "set" on Peaches, Nectarines, Vines, etc., grown under glass. Melons form another illustration of the need for artificial pollination when insects have not access to the flowers, but in this case the male and female organs are not found in the same flower. Hermaphrodite flowers in which the pollen is ripe before the stigma is receptive are called Protandrous, while those in which the stigma is receptive before the pollen is ripe are known as Protogynous—Protandry

is the more common. It also accounts very largely for the succession of expanding flowers. Flowers adapted to wind pollination are called Anemophilous, and notable examples are the inconspicuous ones of Grasses, the Oak and the Hazel, Conifers, etc.; those adapted to pollination by insects are described as Entomophilous, and the Orchids, Legumes, and Labiates are examples of this group. In plants with Anemophilous flowers pollen is prodigally produced, and there are often floral arrangements for entrapping the wind-borne grains. Self-pollination occurs in comparatively few flowers, and may be brought about by contact between the stigma and anther, or the dehiscence of anthers above a receptive stigma. Violets and a few other subjects, besides producing the showy blossoms, also have inconspicuous ones that do not expand; in these self-pollination takes place, and fertilisation follows. Water is the agent by which pollination is effected in a few plants—a striking example is the half-hardy Eel Grass (Vallisneria spiralis). (*See also* HYBRIDISATION, ORCHID HYBRIDISATION, and POLLEN.)

POLYACHYRUS.

Half-hardy herbaceous perennials (*ord.* Compositæ). Propagation, in spring, by division, or by cuttings of the new growths in sandy loam. Soil, light, sandy loam. Winter protection is essential.

Principal Species :—

Pœppigii, 5′, Je., bl.

POLYALTHIA.

Tall-growing stove trees (*ord.* Anonaceæ). Propagation, by cuttings of half-ripened wood in spring in very sandy peat, beneath a bell-glass, over bottom heat. Soil, rich, fibrous loam and sand.

Principal Species :—

cerasoides, 60′, sum., grn. (*syn.* Guatteria cerasoides).
suberosa, 30′, sum., wh. (*syn.* Guatteria suberosa).

POLYANTHUS.

Description.—The Polyanthus (*ord.* Primulaceæ) is one of the prettiest and most prized of the spring flowers. For spring bedding, from its neat habit, it is of much value, and it makes a fine display either massed, in lines, or arranged with other flowers in a mixed border. The Polyanthus is generally considered to be the result of a cross between the Primrose and Cowslip; it possesses the large, upright, open flowers of the former with the bunch-flowered habit of the latter. The Gold-laced varieties were much in vogue among florists for some time, but there are now few grown. They are very beautiful, but are better adapted for growing in pots in frames than in the open ground. For the latter purpose, good self-coloured Polyanthuses are the best.

Propagation. — The Gold-laced and named Polyanthuses by division in August. The others are usually raised from seeds, which produce more vigorous plants than those from division. The seeds may be sown as soon as ripe in pots or pans in a cold frame, or kept until spring and sown then. The seeds germinate irregularly, and the seed pans should be kept for late-germinating plants, as these are often of good quality.

Soil.—Common garden soil, rich, rather moist, and a partially shaded position.

Other Cultural Points.—Polyanthuses in pots should be treated like Auriculas, which *see*.

Varieties.—Besides the Gold-laced, there are Self-coloured crimsons, yellows, and whites, which come almost true from seed, Hose-in-hose, and a few double Polyanthuses. (*See also* PRIMULA.)

POLYCALYMNA.

Half-hardy perennials herbs (*ord.* Compositæ). Propagation, by division or seeds in spring. Ordinary garden soil.

Only Species :—

Stuartii, 1′, spr., sum., wh. (now Myriocephalus Stuartii).

POLYCARPÆA.

Hardy annuals or perennials (*ord.* Caryophylleæ). Propagation, by division or seeds. Soil, sandy loam.

Principal Species :—

aristata, 6″, Je., wh.
microphylla, 3″, Je., wh. (*syn.* gnaphalioides).
latifolia, 4″, Je., wh.

POLYCYCNIS.

A small genus of stove epiphytes (*ord.* Orchidaceæ), closely related to Cycnoches, which *see* for culture. The flowers are borne in racemes, and their peculiar formation brings them under the popular title of Swan Orchids.

Principal Species :—

barbata, 1′, Je., wh., pk. (*syn.* Cycnoches barbatum).
lepida, 1′, sum., br., yel., spotted br., wh.

Other Species :—

gratiosa, 1′, sum., brownish pur., drooping.
Lehmannii, 9″, sum., yel., spotted rosy pur.
muscifera, 1′, Jy., br. (*syn.* Cycnoches musciferum).
vittata, 1′, sum., yel., brownish red (*syn.* Houlletia vittata).

POLYGALA.

A large genus (*ord.* Polygaleæ), comprising hardy annuals, hardy perennials, and hardy and tender shrubs and sub-shrubs. Propagation, by seeds sown in sandy peat for the annuals, by division for the hardy perennials, and by cuttings under a hand-light or in heat for the shrubby species. Soil, fibrous peat three parts, fibrous loam one part, with sharp sand; pot firmly.

Principal Species and Varieties :—

Chamæbuxus, 6″, sum., hdy. sub-shr., creamy yel., tipped pur.
— purpurea, lvs. pur.
grandifolia, 1′, spr., wh., ro. (*syn.* hilariana).
myrtifolia grandiflora, 3′ to 6′, spr., grh., pur. (*syn.* dalmaisiana).
virgata, 4′, sum., grh. shr., pur.
— speciosa, finer than type.

Other Species :—

cordifolia (*see* oppositifolia var.).
dalmaisiana (*see* myrtifolia var.).
Galpinii, 3′ to 5′, Sep., grh., ro., lil.
grandiflora (*see* myrtifolia var.).
latifolia (*see* oppositifolia var.).
oppositifolia, 3′, Je., pur., yellowish grn.; cordifolia and latifolia are vars.
Senega, 1′, spr., hdy. per., pur.
speciosa (*see* virgata var.).
vulgaris, 6″, Je., hdy. per., wh. or bl.

POLYGONATUM. (SOLOMON'S SEAL.)

Pretty, hardy herbaceous perennials (*ord.* Liliaceæ), which are of great beauty in borders,

Polybotrya (*see Acrostichum*).
Polycarpa (*see Idæsia*).
Polychilos (*see Phalænopsis*).

shrubberies, wild gardens, or woodland copses. Multiflorum forces well in pots. Propagation, by division in autumn or early spring. Common moist soil.

Principal Species and Varieties :—

biflorum, 1′ to 3′, My., grn., wh.
latifolium, 2′ to 4′, Jy., wh. (*syns.* hirtum and Convallaria latifolia).
— commutatum, 2′ to 7′, Jy., wh. (*syn.* giganteum).
— Thunbergi, glabrous form (*syn.* Thunbergi).
multiflorum, 2′ to 3′, Je., wh. Common Solomon's Seal.
— bracteatum.
— flore pleno, double flowers.
officinale, 1′, My., wh. (*syn.* anceps).
— flore pleno, double flowers.
— macranthum, larger flowers.
oppositifolium, 2′ to 4′, Ap., wh., grn.
— albo-vittatum, lvs. striped wh.

Other Species and Varieties :—

japonicum, 1½′, Ap., wh.
moserianum, lvs. variegated ; garden var.
polyanthos, 1′, My., wh.
punctatum, 1′ to 2′, My., wh.
roseum, 2′ to 3′, My., ro.
verticillatum, 2′ to 4′, Je., grn., wh.

Photo: Cassell & Company, Ltd.

POLYGONUM LANIGERUM.

POLYGONUM. (KNOTWEED or KNOT GRASS.)

Description.—A large genus (*ord.* Polygonaceæ) of annual or perennial, hardy or greenhouse herbs or sub-shrubs. Many are handsome plants of imposing appearance, others are good border flowers, and a few are pretty on rockwork.

Propagation.—The annuals by seeds sown in gentle heat in spring; the perennials by division in autumn or early spring, and by seeds.

Soil.—Any common soil.

Principal Species and Varieties :—

affine, 6″ to 10″, aut., hdy. per., rosy red (*syn.* Brunonis).
alpinum, 3″ to 4″, sum., hdy. per., wh. (*syn.* polymorphum).
— songaricum, wh.
amplexicaule, 2′ to 3′, Sep., hdy. per., rosy red (*syn.* petiolatum).
— oxyphyllum, lvs. yel.
baldschuanicum, 20′, Sep., hdy. per. cl., wh.; a fine plant.
Brunonis (*see* affine).
compactum, 2′, Sep., hdy. per., wh.
cuspidatum, 4′ to 8′, sum., hdy. per., wh.
macrophyllum, 9″, aut., hdy. per., red (*syn.* sphærostachyum).
orientale, 3′ to 10′, Aug., hdy. ann., rosy pur.
— variegatum, lvs. variegated.
sachalinense, 10′ to 12′, sum., hdy. per., grn., wh.
vacciniifolium, aut., prostrate, hdy. per., ro.

Other Species and Varieties :—

amphibium, 2′ to 3′, Sep., aquatic per., ro. or wh. Willow Grass.
Bistorta, 1½′, Je., hdy. per., red, pk. Bistort, Snakeweed.
capitatum, grh. or hlf-hdy. per., pk.
chinense, 5′, sum., hdy. per., pk., wh., or pur. (*syn.* Ampelygonum chinense).
— foliis pictis, lvs. marked wh.
filiforme, hdy. per., lvs. drooping.
— variegatum, hdy. per., lvs. marbled pale grn., yel.
lanigerum, 2′ to 10′, sum., hlf-hdy. per., red or wh. (*see* figure).
Laxmanni, 1′, Je., hdy. per., wh. (*syn.* angustifolium).
molle, 2′, sum., hdy. shr., wh.
multiflorum, sum., hdy. per. cl., wh.
polystachyum, 3′ to 6′, hdy., wh. or pk.
virginianum 2′ to 5′, Aug., hdy. per., grn., wh.
viviparum, 6″ to 12″, Je., hdy. per., pk.

POLYMNIA.

Greenhouse or half-hardy perennials (*ord.* Compositæ). Propagation, by seeds and division in spring. Soil, fibrous loam three parts, leaf mould and manure one part each, with sharp grit.

Principal Species :—

canadensis, 6′, Jy., wh., yel.
edulis, 8′, sum., yel., edible tubers.
pyramidalis, 10′, aut., st., yel.
Uvedalia, 4′ to 10′, Sep., yel.

POLYPODIUM.

Description.—Polypodium—450 species—is the largest genus in the order Filices. Botanists of late years have merged in Polypodium a number of smaller genera, bringing together plants covering a wide range, not only in geographical distribution,

Poly, or Germander (*see Teucrium*).
Polypappus (*see Tessaria*).
Polyphragmon (*see Timonius*).

but in general appearance. The majority of the species have no difference between the fertile and barren fronds. Most are evergreen, but a few, including the hardy British Dryopteris, are deciduous. In the attachment of the fronds to the rhizome two well-marked divisions may be noted, viz. Eremobrya, in which each frond is distinct from its neighbour and articulated with the rhizome; and Desmobrya, in which no such articulation exists. Again, in cutting, the fronds may range from simple (entire), as in the section Niphobolus, to several times pinnate, as in Dryopteris, or simply pinnate or pinnatifid, as in Heracleum. The following genera are now all included under

Polypodium Phymatodes pustulum (*see p.* 224).

Polypodium, but their separate existence has already caused a number of synonyms to be attached to each plant. So formidable is this list of synonyms that only a few can be given.

Abacopteris.
Adenophorus.
Aglaomorpha.
Ampelopteris.
Anapeltis.
Anaxetum.
Apalophlebia.
Calymnodon.
Campyloneuron.
Colopteris.
Colysis.
Craspedaria.
Crypsinus.
Cryptosorus.
Cyrtomiphlebium.
Cyrtophlebium.
Diblemma.
Dictymia.
Dictyopteris.
Dipteris.
Drynaria.
Dryostachyum.
Galeoglossa.
Glaphyropteris.
Glyphotænium.
Goniophlebium.
Goniopteris.
Grammitis.
Gymnocarpium.
Gynosorium.
Holcosorus.
Lepicystis.
Lopholepis.
Microgramme.
Monachosorum.
Niphobolus.
Niphopsis.
Paragramma.
Phegopteris.
Phlebodium.
Phymatodes.
Pleopeltis.
Pleuridium.
Polycampium.
Pseudathyrium.
Stegnogramma.
Xiphopteris.

Propagation.—Division may be carried out at any season save in winter. Spores are available. They germinate freely, and make good plants. (*See* Ferns.)

Soil.—Two parts fibrous loam, one part leaf mould, and one-eighth sand will suit the majority of those having strong root action. A soil rich in humus suits the varieties of vulgare. Dryopteris likes a few pieces of sandstone added. Drainage must in all cases be free and uninterrupted. Those species having surface-rooting rhizomes should be pegged down upon pans of fibrous peat and sand, with about a fourth part of fibrous loam. A few pieces of sphagnum for surfacing will be an improvement, and charcoal will help to keep the compost sweet under repeated waterings. Epiphytal species, as meyenianum and subauriculatum, do well if grown in pockets in dead tree stems, or in hanging baskets. Little soil is needed, but it should be fibrous. Fibrous peat suits meyenianum well, but subauriculatum needs a little stronger medium.

Other Cultural Points.—Of the greenhouse Polypodiums, aureum (*syn.* Phlebodium aureum) is the most popular; it makes a capital window plant. Its varieties like more heat. Pustulatum is useful for growing in dark corners. Phegopteris is nearly evergreen when grown in pots under glass. Vulgare should be established on dry banks and walls in the hardy fernery. Its varieties make elegant plants for the cool house. All evergreen Polypodiums require moisture the year round, and in summer tree stems must be syringed twice a day, and baskets dipped frequently. Liquid cow manure is a useful stimulant. Snowy fly and thrips give trouble. Sponge for the former; fumigate lightly and sponge for the latter.

Principal Species and Varieties:—

[Note.—The dimensions refer to the fronds, and do not include the length of the stipes.]

albo-squamatum, 1′ to 2′ long, 1′ or more broad, simple or pinnate, leathery, dotted wh. on upper surface, st. (*syn.* Phymatodes albo-squamata).
aureum, 36″ to 60″ long, 9″ to 18″ broad, simple or three-lobed, rootstock covered yel. scales, st. or grh. (*syn.* Phlebodium aureum).
— areolatum, fronds smaller, more leathery, pinnatisect, st.
— glaucum, small, glaucous, st.
— Mayi, fronds silvery, margins crisped, st.
— pulvinatum, 36″ to 48″ long, 9″ to 12″ broad, pinnatisect.
— sporodocarpon, like aureum, but with more narrowly lobed fronds, st. (*syn.* glaucum of gardens).
caudiceps, 6″ long, 12″ to 18″ broad, simple, st., good for baskets (*syn.* Goniophlebium caudiceps).
chnoodes, 12″ to 24″ long, 4″ to 9″ broad, soft, papery, pinnate, good for baskets (*syns.* dissimile and Goniophlebium chnoodes).
crassifolium, 12″ to 36″ long, 1″ to 5″ broad, simple, leathery, wh. dotted, st. (*syn.* Pleuridium crassifolium).
— albo-punctatissimum, glaucous, heavily dotted wh. (*syn.* Pleuridium albo-punctatissimum).
difforme, 3′ to 4′ long, tufted, leathery, st. (*syns.* irregulare and Dryopteris irregularis).
— macrophyllum, 5′ long, 1½′ broad, st.
drepanum, 18″ to 36″ long, 8″ to 12″ broad, leathery, bipinnate, grh. (*syn.* Phegopteris drepana).
Dryopteris, 6″ to 10″ each way, finely cut, deltoid, soft, hdy., deciduous. Oak Fern.
— robertianum, scented like Geranium robertianum (*syn.* calcareum).

fossum, 1′ long, deep grn., st., good for baskets (*syn.* Pleopeltis fossa).
fraternum, 12″ to 18″ long, 6″ to 9″ broad, st. (*syn.* Henchmanni).
glaucophyllum, 4″ to 10″ long, 2″ to 4″ broad, spear shaped, leathery, st. (*syn.* Goniophlebium glaucophyllum). Glaucum and viride are vars.
Heracleum, 3′ to 6′ long, 2′ to 2½′ broad, tufted, pinnatisect, very stiff and leathery, and upright, st. (*syns.* coronans of gardens, not Wallich, morbillosum, and Drynaria Heracleum).
juglandifolium, 1½′ to 2′ long, 1′ to 1½′ broad, leathery, grh. (*syns.* capitellatum and Pleuridium juglandifolium). Tenuicauda is a var.
Krameri, 5″ to 6″ long, 2½″ to 3″ broad, pinnatifid, hdy.; resembles the Beech Fern.
Lingua, 4″ to 8″ long, 1″ to 4″ broad, simple, leathery, st. (*syn.* Niphobolus Lingua).
— corymbiferum, fronds tasselled at apex.
— Heteractis, broader fronds.
loriceum, 12″ to 18″ long, 4″ to 6″ broad, leathery, st.
— latipes, fronds longer and more slender (*syn.* Catharinæ of gardens).
lycopodioides, fronds dimorphic, 2″ to 4″ long, ½″ to 1″ broad, leathery, simple, st. (*syn.* Anapeltis lycopodioides).
— owariense, shorter, blunt-pointed fronds.
— salicifolium, fronds longer and narrower, prettily veined.
menisciifolium, 2′ to 3′ long, 1′ to 1½′ broad, pinnate, leathery, st. (*syn.* Goniophlebium menisciifolium).
meyenianum, 24″ to 36″ long, 8″ to 12″ broad, pinnate, upper pinnæ contracted and fertile, st. (*syns.* Aglaomorpha meyeniana and Drynaria philippinense). Bear's Paw Fern.
pectinatum, 12″ to 24″ long, 2″ to 6″ broad, pinnate, soft, papery, st. (*syn.* Wageneri).
— Paradisiæ, 12″ to 48″ long, 3″ to 8″ broad, pinnatisect, st. (*syn.* Paradisiæ).
penangianum, 12″ to 18″ long, 2″ to 3″ broad, simple, soft, papery, and covered with fine hairs, st.
Phegopteris, 6″ to 9″ long, 4″ to 6″ broad, deltoid, finely cut., soft, papery, nearly ev., British. Beech Fern, Beech Polypody.
— multifidum, very finely cut, a constant var., hdy.
Picotii, 36″ long, 4″ to 6″ broad, leathery, simple, dark grn., grh.
piloselloides, fronds dimorphic, barren ones 1″ to 3″ long, ½″ to ¾″ broad, simple, leathery, pale grn., st., rhizome long and creeping (*syns.* Goniophlebium and Lopholepis piloselloides).
— ciliatum, fertile fronds with projecting sori, st.
plesiosorum, 1′ to 2′ long, 1 broad, pinnate, close to loriceum, but more papery (*syns.* colpodes, gonatodes, and rhodopleuron). Appendiculatum is a var.
pustulatum, 3″ to 9″ long, ¼″ to ½″ broad, pinnatifid, papery, grh. (*syn.* Phymatodes pustulata). Scented Polypody.
quercifolium, barren fronds 3″ to 12″ long, 2″ to 6″ wide, fertile ones 2′ to 3′ long, 1′ broad, stiff, st. (*syn.* Drynaria quercifolia).
rivale, barren fronds 4″ to 6″ long, 2″ broad, fertile 1½′ to 2′ long, 6″ to 8″ broad, soft, papery, pinnatifid, st. (*syn.* Drynaria mollis).
rupestre, 4″ to 8″ long, 1″ to 1½″ broad, simple, leathery (Niphobolus rupestris of gardens, *see* serpens).
Schneideri, 9″ each way, triangular, grh., hybrid (aureum × vulgare elegantissimum, *syn.* Phlebodium Schneideri).
Scouleri, 6″ to 12″ long, 4″ to 8″ broad, pinnate, leathery, grh. (*syn.* Goniophlebium Scouleri).
subauriculatum, 10′ to 12′ long, 8″ to 12″ broad, pinnate, st., a noble basket Fern (*syn.* Schellolepis subauriculata); Reinwardtii is a var.
tenellum, 12″ to 24″ long, 2′ to 4″ broad, grh. (*syn.* Arthropteris tenella).
vacciniifolium, 1″ to 2″ long, ¼″ to ½″ broad, entire, rhizome long and densely scaly (*syn.* Lopholepis vacciniifolia).
verrucosum, 3′ to 4′ long, 1′ broad, pinnate, st., a noble plant (*syn.* Schellolepis verrucosa).
vulgare, 6″ to 12″ long, 3″ to 6″ broad, pinnatisect, hdy.; about forty of the many vars. are in the Kew collection. Adder's Fern, Brake Root, Golden Maidenhair, Wall Fern, Wood Fern, Common Polypody.
— bifidum, 10″ to 15″ long, 3″ broad, fronds forked in varying degrees.
— cambricum, 1½′ long, 4″ to 5″ broad, bipinnatifid; one of the best.
— crenatum, of thin texture.
— cristatum, 12″ to 18″ long, 4″ wide, forked, crested.
— cornubiense, 8″ to 10″ long; like Killarney Fern.
— elegantissimum, very finely cut fronds; one of the best.
— multifido-cristatum, finely cut, much forked (*syn.* grandiceps).
— omnilacerum, 1′ to 1½′ long, very fertile.
— pulcherrimum, 1′ long, bipinnatifid, between omnilacerum and cambricum.
— trichomanoides, 1′ long, very finely cut; one of the finest.

Other Species and Varieties :—

adnascens, 6″ to 12″ long, 1″ to 1½″ broad, wh. on lower surface, st. (*syn.* Niphobolus adnascens). Lævis is a var.
adnatum, 1½′ to 3′ long, 1′ broad, leathery, st. (*syn.* Goniophlebium adnatum).
albo-punctatissimum (*see* crassifolium var).
alpestre, 12″ to 24″ long, 6″ to 8″ broad, tufted, soft, papery, much cut, resembles Asplenium Filix-fœmina, hdy. (*syn.* Pseudathyrium alpestre).
— flexile, hdy. (*syn.* Pseudathyrium flexile).
amœnum, 12″ to 24″ long, 6″ to 12″ broad, hard, papery, pinnatisect, grh.
amphostemon (*see* angustifolium var.).
angustatum, 6″ to 12″ long, ½″ to 1½″ broad, very leathery, simple, grh. Angustatum of Blume is palmatum.
angustifolium, 12″ to 18″ long, ¼″ broad, leathery, simple, st. Amphostemon and ensifolium are vars.
appendiculatum, 18″ to 24″ long, 8″ to 10″ broad, pinnate, soft, papery, st. (*syn.* Phegopteris appendiculatus). Appendiculatum of Klotzsch is a var. of plesiosorum.
areolatum (*see* aureum var.).
Billardieri, 18″ long, 9″ broad, pinnatisect, simple when young, grh. (*syn.* Phymatodes Billardieri).
biseriale, 2′ to 3′ long, 1′ broad, much cut, thin, papery, st. (*syn.* Phegopteris biserialis).
calcareum (*see* Dryopteris robertianum).
californicum, 6″ to 9″ long, 3″ to 5″ broad, pinnate, grh. (*syns.* intermedium and Goniophlebium californicum).
cambricum (*see* vulgare var.).
camerooniánum, 3′ to 4′ long, 2′ broad, soft, papery, bipinnatifid, grh. (*syn.* Dictyopteris camerooniana).
Catharinæ (*see* loriceum, var. latipes).
colpodes (*see* plesiosorum).
conjugatum, 2′ to 4′ long, 1′ to 1½′ broad, nearly pinnate, st. (*syn.* coronans of Wallich).
contiguum (*see* longifolium).
coronans of gardens (*see* Heracleum).
coronans of Wallich (*see* conjugatum).
cuspidatum (*see* persicæfolium).
dissimile (*see* chnoodes).
elasticum, 9″ to 18″ long, 2″ to 4″ broad, pinnate, st. (*syns.* Plumula and Schkurii of gardens).
ensifolium (*see* angustifolium).
Gardneri, 12″ to 18″ long, 1″ to 1½″ broad, simple, st. (*syn.* Niphobolus Gardneri).
guatemalense, 2′ to 3′ long, 1′ broad, pinnate, leathery, st. (*syn.* Phlebodium inæquale).
harpeodes (*see* loriceum, var. latipes).
hastæfolium, 6″ to 9″ long, 2″ broad, leathery, st. (*syn.* Phegopteris hastæfolia).
hastatum, 4″ to 6″ long, ½″ to 1½″ broad, simple, leathery, grh. (*syn.* Phymatodes hastatum).
hemionitideum, 9″ to 18″ long, 2″ to 3″ broad, leathery, simple, st.

hexagonopterum, 8′ to 12″ long, 8″ broad, deltoid, bipinnatisect, soft, papery (*syn.* Phegopteris hexagonoptera).
hirsutum, 6″ to 9″ long, spear shaped, tripinnatifid, st. (*syn.* Phegopteris hirsuta).
hymenodes (*see* superficiale).
inæquale (*see* guatemalense).
incanum, 2″ to 4″ long, 1″ to 1½″ broad, leathery, pinnate, st. (*syn.* Lepicystis incana).
incurvatum, barren fronds 6″ to 9″ each way, deltoid, pinnatifid, leathery, st. (*syn.* Phymatodes incurvata).
intermedium (*see* californicum).
irioides, 12″ to 36″ long, 1″ to 3″ broad, simple, fleshy, st. (*syn.* Phymatodes irioides).
karwinskianum (*see* plebeium).
lachnopus, 12′ to 18″ long, 3″ to 4″ broad, pinnate, soft, papery, grh. (*syn.* Goniophlebium lachnopus).
lævigatum, 18″ long, 3″ to 4″ broad, bipinnatifid, parchment-like, st. (*syn.* Phegopteris lævigata).
lanceolatum, 3″ to 9″ long, ¼″ to 1″ broad, simple, leathery, st. (*syn.* Pleopeltis ensifolia).
leiorhizon, 2′ to 4′ long, 1′ to 2′ broad, leathery, grh. (*syn.* Phymatodes leiorhiza).
lepidopteris, 6″ to 18″ long, 1½″ to 3″ broad, pinnate, fleshy, st.
— **sepultum**, 1′ to 1½′ long, silvery scales, st. (*syns.* Goniophlebium sepultum).
longifolium, 12″ to 24″ long, ½″ to 1½″ broad, simple, leathery, st. (*syn.* contiguum).
longissimum, 12″ to 48″ long, 6″ to 12″ broad, pinnatifid, leathery, st. (*syn.* Phymatodes longissima).
macrourum, like Phymatodes, but has long-tailed fronds, st.
membranaceum, 12″ to 36″ long, 2″ to 6″ broad, thin, st. (*syn.* Colysis membranacea).
— **grandifolia**, larger fronds.
multilineatum, 3′ to 4′ long, 1½′ to 2′ broad, pinnate, st. (*syn.* Goniopteris multilineata).
musæfolium, 12″ to 36″ long, 3″ to 4″ broad, simple or pinnatifid, leathery, veins dark grn. (*syn.* Phymatodes musæfolia).
neriifolium, 1′ to 3′ long, 1′ to 1¼′ broad, pinnatisect, grey scales, st. (*syns.* brasiliense and preslianum).
nigrescens, 2′ to 3′ long, 1′ to 1½′ broad, pinnatisect, leathery, st. (*syn.* Phymatodes nigrescens).
nigripes, 12″ long, 6″ to 7″ broad, pinnate, leathery, st. (*syn.* Phlebodium nigripes).
owariense (*see* lycopodioides var.).
peltideum, a var. of Phymatodes.
pennigerum, 18″ to 24″ long, 8″ to 12″ broad, bipinnatifid, grh. (*syn.* Goniopteris pennigera).
percussum, 6″ to 12″ long, ¾″ to 1½″ broad, simple, leathery, st. (*syn.* Pleopeltis percussa).
persicæfolium, 24″ to 36″ long, 8″ to 12″ broad, resembles subauriculatum of Blume, st. (*syns.* cuspidatum and Goniophlebium cuspidatum).
— **grandidens**, more deeply toothed than type.
Phyllitidis, 12″ to 36″ long, 3 to 4″ broad, like an erect-growing Hart's Tongue Fern, st. (*syn.* Campyloneurum Phyllitidis).
Phymatodes, 2′ to 3′ long, 1′ broad, pinnatisect, st. (*syns.* Drynaria and Phymatodes vulgaris).
— **longipes**, longer stalks and more upright fronds.
— **pustulum** (*see* p. 222).
pictum, 5″ to 6″ long, three-lobed, st. (*syn.* Pleopeltis picta).
plebeium, resembles vulgare, but has br. scales, st. (*syn.* karwinskianum).
Plumula (*see* elasticum).
preslianum (*see* neriifolium).
propinquum, barren fronds 4″ to 9″ long, 3″ to 4″ broad, fertile 18″ to 36″ long, 12″ broad, pinnate or pinnatifid, st. (*syns.* Willdenovii and Drynaria propinqua).
pulvinatum (*see* aureum var.).
repens, 6″ to 18″ long, 1″ to 3″ broad, simple, leathery, st. Undulatum is a var.
reptans, 4″ to 12″ long, 1″ to 3″ broad, st. (*syn.* Campyloneurum repens).
— **asplenioides**, fronds larger, more erect.
rigidulum, barren fronds 6″ to 9″ long, 3″ to 4″ broad, fertile 24″ to 48″ long, 12″ to 18″ broad, pinnate, leathery, st. (*syns.* diversifolium and Drynaria rigidula).
robertianum (*see* Dryopteris var.).
rostratum, 2″ to 4″ long, ½″ to 1″ broad, simple, leathery, good for tree trunks, st. (*syn.* Phymatodes rostrata).
sepultum (*see* lepidopteris var.).
serpens, barren fronds small, round, fertile 6″ long, ½″ broad, leathery, woolly, grh. (*syn.* Niphobolus rupestris of gardens).
spectrum, 3″ to 4″ long, halbert shaped, st. (*syn.* Colysis spectra).
sphærocephalum (*see* angustatum).
sporodocarpon (*see* aureum var.).
stigmaticum, close to lycopodioides, but thinner, st. (*syn.* Anapeltis venosa).
subpetiolatum, 36″ long, 6″ to 8″ broad, pinnate, soft, st.
— **biserratum**, longer fronds.
superficiale, 6″ to 12″ long, 1″ to 2″ broad, simple, grh. (*syns.* hymenodes and Phymatodes superficialis).
tricuspe, 2″ to 4″ each way, hastate, leathery, grh. (*syn.* Niphobolus tricuspis).
vacillans (*see* loriceum latipes).
Veitchii, 1″ to 1½″ long, three-lobed, deltoid, grh.
Xiphias, 12″ to 18″ long, 3″ broad, simple, st. (Pleopeltis Xiphias).

POLYPORUS.

Fungi that are chiefly parasitic on forest trees, especially Spruce and Oak, and their presence is always an indication that the timber of the host is valueless, except as firewood, for infested trees never recover from an attack. As they grow on indefinitely, these Fungi often attain a large size (2′ diameter). The spores are in tiny tubes on the under surface of the pileus (cap), and thus the species of Polyporus (like Boletus) differ from the true Mushrooms (Agaricus), in which the spores are borne on the gills, or folds of the hymenium.

POLYPTERIS.

Herbaceous perennials (*ord.* Compositæ), requiring winter protection. Propagation, by seeds or division. Soil, loam and sand.

Principal Species :—

hookeriana, 2′, sum., rosy pk. (*syn.* Palafoxia hookeriana).
texana, 2′, sum., pk. (*syn.* Palafoxia texana).

POLYSCIAS.

Stove trees (*ord.* Araliaceæ). Propagation, by cuttings in sand over bottom heat. Soil, loam, leaf mould, and sand.

Principal Species :—

paniculata, 10′, handsome lvs., grn., netted reddish br., with red midrib to each leaflet (*syn.* Terminalia elegans); the genus Terminalia is really far removed.

POLYSTACHYA.

A genus of epiphytal stove Orchids (*ord.* Orchidaceæ), containing few species of horticultural value. Given moisture, good drainage, and a compost of peat and sphagnum, cultivation is easy.

Principal Species :—

bracteosa, 6″, Jy., yel., br.
bulbophylloides, 3″, Je., wh., spotted or.
grandiflora, 1′, Jy., grn., red, wh.
Kirkii, 8″, sum., wh., pur.
ottoniana, 8″, spr., wh., fragrant.
pubescens, 6″, Jan., yel., red (*syn.* Epiphora pubescens).

Polypody (*see Polypodium*).
Polyspora (*see Gordonia*).

POLYSTICHUM.

The tendency has been to reduce the number of genera of Ferns. Amongst genera which have been merged in others is Polystichum, now referred to Aspidium. For Aspidium aculeatum and A. angulare, sometimes found in gardens under Polystichum, *see* ASPIDIUM.

Principal Species :—

odorata, 4″, Oct., wh. (now Massonia odorata).

pygmæa, 6″, Ap., lil. (*syns.* Massonia ensifolia, M. uniflora, and M. violaceæ).

POMADERRIS.

A genus (*ord.* Rhamneæ) of greenhouse ever-

Photo: Cassell & Company, Ltd.

POPULUS TREMULA (*see p.* 226).

POLYXENA (*syn.* POLYANTHES of JACQUIN).

Bulbous plants (*ord.* Liliaceæ), thriving in a warm border or in a cold frame. Propagation, by offsets or seeds. Soil, loam, peat, leaf mould, and sand. Bulbs out of doors must be lifted and stored in winter. They are not safe in the open ground, particularly in damp places.

green shrubs. Propagation, by cuttings in sand, under a bell-glass. The cuttings should be dried a little before being inserted, or they may damp off. Soil, fibrous loam and peat, with sand.

Principal Species :—

apetala, 4′, Je., grn. (*syn.* aspera).

elliptica, 6′, Je., creamy yel.

POMAX.

A greenhouse evergreen (*ord.* Rubiaceæ). Propagation, by cuttings in very sandy peat. Soil, loam three parts, fibrous peat one part, and sand.

Only Species :—

umbellata, 1′, Jy., greenish wh. (*syns.* hirta and Opercularia umbellata).

POMEGRANATE (*see* PUNICA).

POMMERESCHIA.

A rarely cultivated genus of stove plants (*ord.* Scitamineæ). The only species is Lackneri, 1½′, summer, yellow, a foliage plant much resembling Phrynium, and needing similar treatment.

POMPON.

In horticulture this term is used to indicate a certain class of Chrysanthemums and Dahlias which have more or less rounded or tuft-like heads of flowers. The fancied resemblance between these small, compact bloom heads and the ornaments formerly used on military helmets probably led to the adoption of "pompon" as a class title.

PONDS.

These are areas of water of any size that may be naturally or artificially formed. They are very desirable adjuncts to a garden, as in them may be grown numerous aquatic plants, while their contents will be found of inestimable value during the prevalence of drought, as the water will be softened by exposure and hence more valuable than that drawn from taps. In the artificial formation of ponds puddling with clay is resorted to. An excavation of the requisite size is made, allowing for the puddling. The sides should be puddled to a thickness of 1½′, and must have a gentle downward slope; the bottom must be similarly lined, but 1′ depth will suffice if the mass is properly pounded down. Care must be taken to have a substantial backing for the sides, or they will break away. The sides may advantageously be covered with a few inches of gravel. A more permanent method of forming ponds is to concrete the sides and bottom, but it will be found considerably more expensive.

PONERA.

Epiphytal stove Orchids (*ord.* Orchidaceæ), of no horticultural value and rarely cultivated; even in botanical collections they are seldom represented by more than one or two species.

Principal Species :—

amethystina, 1½′, sum., wh., bluish pur.
juncifolia, 1′, sum., buff.
Kienastii, 6″, Sep., greenish br. (now Scaphyglottis Kienastii).

PONGAMIA.

Evergreen stove climbers and shrubs (*ord.* Leguminosæ). Propagation, by cuttings of firm growths in spring, in heat. Soil, equal parts fibrous peat and loam, with coarse sand.

Principal Species :—

glabra, 10′, Je., wh., red.
grandiflora, 6′, My., wh.
marginata, 3′, My., yel. (now Derris cuneifolia).

Pommelo (*see Citrus decumana*).
Pompion (*see Cucurbita*).
Pondweed, Cape (*see Aponogeton distachyon*).
Pontia (*see Pieris*).

PONTEDERIA.

Hardy and stove aquatics (*ord.* Pontederiaceæ). (*See also* EICHORNEA.) Propagation, by division. Soil, mellow loam, in a tub or shallow cistern of water.

Principal Species :—

cœrulea, 2′, Jy., bl.
cordata, 2′ to 4′, Jy., hdy., bl.

PONTHIEVA.

A genus of terrestrial stove Orchids (*ord.* Orchidaceæ). The small flowers are borne in erect spikes. Compost, equal parts of fibrous loam and peat, with coarse sand and finely broken crocks. Afford ample drainage. Place on a shelf and keep dry during the resting period.

Principal Species :—

glandulosa, 1′, spr., greenish wh.
maculata, 1′, spr., sum., br., wh., yel.
petiolata, 1½′, sum., light yellowish br

POPPY (*see* PAPAVER).

POPULUS. (POPLAR.)

Hardy deciduous trees (*ord.* Salicineæ), of considerable ornamental value and some economic properties. The small green flowers are borne in catkins, in March and April. The majority are quick growers, suitable for screens. Propagation, by seeds, cuttings, layers, and suckers; grafting for weeping and other varieties. Soil, deep, moist loam preferably. The trees resent stagnant moisture.

Principal Species and Varieties :—

alba, 60′ to 100′. Good vars. are nivea (*syns.* acerifolia and argentea), pyramidalis (*syns.* bolleana and Korolkowi), macrophylla (*syn.* Picarti), and foliis aureis variegatis. Abele, or White Poplar.
balsamifera, 70′, lvs. tapering and pointed. Candicans and variegata are vars. Balsam Poplar.
canescens, 80′, lvs. hoary beneath when young. Grey Poplar.
deltoidea, 80′ to 100′, lvs. heart shaped (*syns.* canadensis, cordata, monilifera, etc.). Best vars. are aurea (*syns.* canadensis aurea and vanhoutteana), and erecta (*syns.* canadensis erecta and monilifera erecta). Necklace Poplar.
grandidentata, 60′, lvs. deeply toothed.
nigra, 60′. Black Poplar. — pyramidalis, distinct (*syns.* dilatata, fastigiata and pyramidalis). Lombardy Poplar.
tremula, 50′ to 80, grey bark. Aspen (*see p.* 225).

Other Species and Varieties :—

acerifolia (*see* alba var. nivea).
argentea of gardens (*see* alba var. nivea).
bolleana (*see* alba var. pyramidalis).
canadensis (*see* deltoidea).
cordata (*see* deltoidea).
dilatata (*see* nigra var. pyramidalis).
fastigiata (*see* nigra var. pyramidalis).
græca (*see* tremuloides).
heterophylla, 40′ to 60′, lvs. large, hoary when young. Pendula and villosa are vars.
Korolkowi of gardens (*see* alba var. pyramidalis).
laurifolia, 70′, lvs. Laurel

Pop Corn (*see Maize and Zea*).
Pope's Head (*see Melocactus*).
Poppy, Californian (*see Platystemon californicum*).
Poppy, Corn (*see Papaver Rhœas*).
Poppy, Horned (*see Glaucium luteum*).
Poppy, Mallow (*see Callirhöe*).
Poppy, Mexican (*see Argemone*).
Poppy, Opium (*see Papaver somniferum*).

shaped (*syns.* balsamifera laurifolia, salicifolia and viminalis).
monilifera (*see* deltoidea).
pyramidalis (*see* nigra var.).
Simonii, 80′, bark reddish br., lvs. greyish wh. beneath.
tremuloides, 30′ to 50′ (*syn.* græca). There is a pendulous var. American Aspen.

PORANA.

Twiners (*ord.* Convolvulaceæ) requiring stove culture. Propagation, by cuttings of short side growths, in sand, in heat; or by seeds for the annuals, sown in spring. Soil, loam, peat, and sand.

Principal Species :—

paniculata, 25′, Oct., wh. (*syn.* Dinetus paniculatus).
racemosa, 20′, sum., aut., ann.,wh. Snow Creeper.
volubilis, 30′, Jy., ev., wh.

PORANTHERA.

Greenhouse evergreen shrubs (*ord.* Euphorbiaceæ). Propagation, by cuttings of side growths getting firm, in sand, in heat. Soil, loam, peat, and sand.

Principal Species :—

ericæfolia, 1′, Jy., wh.

PORLIERIA.

Evergreen stove shrubs (*ord.* Zygophilleæ). Propagation, by cuttings of ripe growths in spring, in sand, in heat. Soil, fibrous loam and peat with coarse sand.

Principal Species :—

hygrometra, 2′, Ap., greenish wh.

PORPHYROCOMA.

Stove or intermediate house plants (*ord.* Acanthaceæ), closely allied to and requiring the same treatment as Dianthera, which *see*.

Principal Species :—

lanceolata, 3′ to 5′, spr., red, pur. (*syns.* illustris and Dianthera lanceolata).

PORTEA.

Stove perennials (*ord.* Bromeliaceæ). Propagation, by suckers and division. Soil, loam, peat, and a little decomposed cow manure.

Principal Species :—

kermesina, 1½′, aut., bl., bracts ro. (*syn.* Billbergia Brongniartii).
legrelliana, 6″, sum., red, pur. (now Ortgiesia legrelliana).
tillandsioides (*see* Ortgiesia tillandsioides).

PORTENSCHLAGIA.

Hardy perennials (*ord.* Umbelliferæ). Propagation, by cuttings in sand, under a bell-glass. Light, well-drained soil.

Only Species :—

ramosissima, 3′, sum., creamy wh.

PORTLANDIA.

Evergreen stove shrubs (*ord.* Rubiaceæ). Propagation, by cuttings of firm shoots in very sandy soil. Soil, loam, peat, leaf mould, and sand.

Principal Species :—

coccinea, 2′ to 3′, Je., sc.
grandiflora, 10′, Je., wh., fragrant at night.
platantha, 3′, Jy., wh.

PORTUGAL LAUREL (*see* PRUNUS).

PORTULACA. (PURSLANE.)

Description.—Pretty, fleshy plants (*ord.* Portulaceæ), of considerable value in the garden, greenhouse, or stove, the one best known being grandiflora, of which there are many brilliantly coloured varieties, which are charming in beds or borders. Oleracea is the culinary Purslane, the old shoots of which are used for pickling or as potherbs, and the young ones in salads. (*See* PURSLANE.)

Propagation.—The annuals from seeds sown as recommended for Half-hardy Annuals, which *see*.

Soil.—The annuals in a light, rich, firm soil in a sunny border; the perennials in loam, leaf soil, and sand.

POTATO VICAR OF LALEHAM (*see p.* 229).

Principal Species and Varieties :—

foliosa, 6″, Je., hlf-hdy. ann., yel.
Gilliesii, 6″, Je., grh. ev., red, pk.
grandiflora, 6″, Je., hlf-hdy. ann., yel., pur. Sun Plant.
— compacta, dwarf form of varied colours.
— Regeli, salmon buff.
oleracea, 6″, Je., hdy. ann., yel. Common Purslane.
Thellusonii, 1′, Je., hlf-hdy. ann., sc. (*syn.* grandiflora Thellusonii).
— lutea, yel.

PORTULACARIA.

Greenhouse shrubs (*ord.* Portulaceæ). Propagation, by cuttings of young shoots, dried for some hours before being inserted in dry, sandy soil. Light soil.

Principal Species :—

afra, 3′, pk. Purslane Tree.

POSOQUERIA.

Stove evergreen shrubs with fragrant flowers (*ord.* Rubiaceæ). Propagation, by cuttings in sandy peat in brisk heat. Soil. loam three parts, leaf mould one part, peat half part, with sand. (For general treatment, *see* GARDENIA.)

Porocarpus (*see Timonius*).
Porpax (*of Salisbury, see Aspidistra*).
Porpax (*of Lindley, see Eria*).
Porphyrostachys (*see Stenoptera*).

Portugal Quince (*see Pyrus*).

Principal Species :—

formosa, 12′, Jy., wh.
fragrantissima, 10′, Jy., wh.
latifolia, 6′, aut., wh. (*syn.* macrophylla).
longiflora, 6′, Jy., wh.
macropus, 6′, sum., wh.
multiflora (now Randia longiflora).

POTATO.

Description.—This is the most important of all vegetable crops, and the probabilities all point in the direction of enhanced value in the future, when the tuber becomes more recognised as a medium from which commodities of commercial value may be manufactured. The Potato is the one vegetable of the many grown in British gardens that can be utilised for at least one meal every day in the year, and it should, therefore, in the small garden particularly, have a very conspicuous place. It is not possible to say exactly how much ground should be devoted to Potato culture, as tastes and requirements differ, but the cottager should have at least one-third of the garden under Potatoes. In large gardens where choice vegetables are in constant demand, the main crop Potatoes should be grown outside the walls, only the early varieties finding a place under the better conditions that prevail in the garden proper.

Potato Windsor Castle (*see p.* 229).

History.—The introduction of the Potato is usually credited to Sir Walter Raleigh, but authority confers the honour upon a Mr. Herriot. The great herbalist Gerarde, whose garden was on the Thames side, probably near to the site occupied by Somerset House, grew what he termed the "Potatoe of Virginia," and figured it in his "Herbal" in 1597. Neither then nor for a period of nearly 200 years was the Potato recognised as a valuable food product. During the century just closed great efforts were made to improve the cropping properties and the quality, while, since the initial visitation of the murrain, raisers have endeavoured, and with some success, to add disease-resisting powers. Solanum tuberosum has played by far the most important part in the progress of the Potato. It was thought that S. Maglia would prove disease resisting, but such was not the case.

Preparing Ground.—Generally speaking, the addition of fresh, wet manure to the ground for Potatoes is an error, as it encourages a luxuriant growth, which is very liable to take the disease. When land is in good cultivation, thorough mechanical working will set free sufficient food for the development of a satisfactory crop; but if known to be slightly deficient, it is well to make up with chemical or artificial foods rather than stable manure. If, however, the land is lacking in humus, short, decomposed, natural manure should be thoroughly incorporated in working, and good results will accrue. In making up mixtures of chemical manures consideration should be given to the nature of the soil, but the following will be found of value:—

For heavy soils in fairly good condition :—

3 parts superphosphate of lime 1 part kainit. 1 part nitrate of soda. 1 part bone flour.	3 oz. to 1 yard of drill at planting time.

For light soils in poor condition :—

3 parts superphosphate of lime. 2 parts kainit. 2 parts nitrate of soda.	4 oz. to 1 yard of drill at planting time.

In each case 1 oz. of nitrate of soda may be applied, just after the first earthing, to each 1 yard run of row; it should not be put on the plants. For land under plough culture, a combination of natural and artificial manures is best. To each ton of farmyard manure add 14 lb. guano and 7 lb. kainit. The manure should be spread out thinly, and have the guano and kainit distributed over the surface. The mass should then be made into a heap, and be turned twice or thrice prior to use.

Planting.—This can be done in drills of varying depth, or in holes made with a Potato dibber. The former plan is the better. The drills should be drawn for the early varieties 5″ or 6″ in depth, and for second early and main crop sorts 3″. For the Ashleafs, and other small growers, the drills should be 20″ apart and the sets 12″ asunder in the rows; for varieties with medium tops the drills should be

30″ and the sets 15″ apart, and for very strong growers the distances ought to be 36″ and 18″ respectively. These measurements are the minimum for each section, and may be increased at discretion. The more room that is accorded the better, though not necessarily the heavier the crop. The fact that the plants have sufficient space to build up stems, leafstalks, and leaves that are perfect in all their parts, means that the tuber growth will be of corresponding excellence. The tubers are simply swollen, underground stems whose value lies in the starch that is manufactured by the perfect leaves. Some growers of Potatoes, especially for exhibition, almost double the spaces suggested above, but the system would be extravagant for tubers for table use, where great size is a disadvantage.

Earthing.—This is a very important operation, whether early or main crop Potatoes are under treatment. In the former case the earth should be drawn up to the rows with the first indications of the plants above ground, or the tops may be cut down by frosts. With the main crop varieties care should be taken that the ridge shall not be trough shaped at the top, or it will gather moisture and materially assist the spread of the disease. A few days prior to earthing, the ground should be well hoed, to destroy weeds and bring the soil into better condition for drawing up to the plants when necessary.

Times of Planting.—The earliest may be planted in March, but a warm, sheltered border should be chosen, or the plants will almost certainly be injured by frost. Some long, loose litter should be at hand for scattering over the plants when frosts are imminent. For the open quarters, from the middle of April to the end of the first week in May will be found the best time.

Storing Potatoes. — The main crop and late varieties are utilised for storing, for which purpose the tubers must be thoroughly ripened and free from disease. Any dark, frost-proof place is suitable. They may be stored in "pies" sunk in the ground, or in clamps raised above the surface, lining and covering with straw in each case, and leaving ventilators at the top for the escape of the warm moisture which will be generated. It is desirable that examinations be made at intervals to ascertain that disease is not present, and to remove any sprouts or shoots.

Potatoes in Pots and Frames.—The earliest Potatoes are those from pots, 10″ or 12″ being useful sizes. Prepared sets having one or two strong sprouts are used, and the pots are barely half filled with light, rich soil. Two sets are required for each pot, and these may be just covered. Start in a warm temperature, removing later to less heat and an abundance of light, finishing in a greenhouse. Care must be exercised in watering. Sharpe's Victor will be found an excellent variety for this purpose, as well as for frame culture. In this method the frames are placed on beds of leaves and manure, the latter somewhat spent for preference. The bed must not be soiled until it has reached the maximum heating point and is declining. Sufficient head room should be allowed, as the foliage should never touch the glass, and material should be at command for covering during severe weather.

Potatoes for Seed.—The sets for planting may be cut or uncut, prepared or unprepared, according to the choice of the grower. Whole sets (save for a slice taken off to hasten decay when the set has done its work) weighing from 2 oz. to 3 oz. give good results. For strong-growing sorts like Up-to-Date, the sets should not weigh more than 2½ oz., or there may result a preponderance of coarse, ungainly tubers. If the sets are too large for planting they should be cut from top to bottom, so as to ensure having good buds or eyes on each portion. Sets are prepared for planting in shallow boxes holding about 1 peck. The tubers are placed on end, and if the boxes or trays have sides narrower than the ends, they may be piled one above the other to any convenient height. One or two growths only should be retained, the others being persistently removed, so as to concentrate the energy in the sprouts that remain. This ensures a crop of tubers of more even size and shape than the planting of cut sets would do. In preparing sets, a light, airy, but perfectly frost-proof place is essential.

Potato Milton Gem.

Selections of Varieties :—

For Pots and Frames :—

Sharpe's Victor. Harbinger. Snowdrop.

First Early :—

Puritan. Sharpe's Victor. Sutton's Al.

Second Early :—

Reliance. Snowdrop. Webber's White Beauty.

Main Crop :—

Beauty of Hebron. Daniels's Special.
*British Queen. *Up-to-Date (*see p.* 230).
Crawley Prizetaker. Windsor Castle (*see p.* 228).

* These for very heavy crops.

For Exhibition :—

White Round :—

Sunbeam. Royal Sovereign. Windsor Castle.

Coloured Round :—

Lord Tennyson. Vicar of Laleham (*see p.* 227).
Milton Gem (*see* figure).

White Kidney :—

Satisfaction. Snowdrop. Up-to-Date.

Coloured Kidney :—

Beauty of Hebron. Edgecote Purple. Reading Ruby.

Potato Disease.—The common Potato disease, Phytophthora (*syn.* Peronospora) infestans, does immense damage in some seasons. The fungus is encouraged by bad cultivation in the form of close

planting, which prevents light and air reaching the bases of the plants and the surface of the soil; and by leaving infested plants to rot on the ground. When the disease is established there is no cure. If, however, Bordeaux Mixture, which *see*, is applied to the surfaces of the leaves immediately the disease makes its appearance in the form of downy patches, its progress may be arrested. The liquid mixture should be applied through a knapsack sprayer. Sprayings should be made at intervals of three weeks. Every diseased leaf, stem, and tuber should be burned. (*See* PHYTOPHTHORA.)

Potato Scab.—This is encouraged by the presence in the soil of an overabundance of sharp grit. It is often caused by a fungus of which little or nothing is known save that scabbed sets almost invariably produce a similarly infested crop. This may be prevented by soaking the tubers for one and a half

POTATO UP-TO-DATE (*see p.* 229).

or two hours in a solution of 1½ oz. corrosive sublimate in 25 gallons of water. All tubers treated should be planted or burned, as they are poisonous.

POTATO ONION.

A variety of Allium Cepa, also known as the Underground Onion. It produces no seed, but is increased by bulbs formed beneath the soil. Except in districts where ordinary Onions do not succeed well, Potato Onions are seldom grown, and their culture is largely confined to cottage gardens. Plant the bulbs in February in the same way as Shallots; lift and harvest the crop in August. The Potato Onions keep well, and are useful for flavouring purposes.

POTENTILLA. (CINQUEFOIL.)

Description.—A valuable genus of herbs or subshrubs (*ord.* Rosaceæ), principally half-hardy perennials and a few annuals. They generally make good border plants, the hybrids being the more valuable for this purpose, and a number of the Alpine species make capital rock plants. Propagation, by seeds or division. Common garden soil, with the addition of sand for the Alpines. The hybrids like a rich, well-manured soil.

Principal Species, Hybrid, and Varieties:—

[NOTE.—All hardy perennial herbs except where otherwise stated.]

alchemilloides, 6″, sum., wh.
ambigua, 6″, Je., yel.
argyrophylla, 1½′ to 3′, sum., yel., lvs. silky.
— atrosanguinea, crim. (*syn.* atrosanguinea).
fruticosa, 2′ to 5′, sum., hdy. shr., yel.
— Friedrichseni, 2′ to 3′, sum., hdy. shr., pale yel., hybrid.
hopwoodiana, 1½′, Je., pale yel., ro., hybrid.
nepalensis, 1½′, sum., crim. (*syn.* formosa).
— nana, 1′, crim.
— pallida, pale red.
nitida, 3″ to 6″, sum., ro.
— alba, wh.
— atrorubens, rosy pur.
— grandiflora, pk.
— rosea, ro.
Saxifraga, 4″ to 6″, My., wh.

Potato, Sweet (*see Batatas edulis*).

Other Species and Varieties:—

alba, 6″, Mch., wh.
alpestris, 6″ to 12″, Jy., yel. (*syn.* maculata).
Anserina, 6″, Jy., yel. Silver Weed.
argentea, 6″, Jy., yel.
aurea, 9″ to 12″, sum., yel. (*syn.* crocea).
— ambigua, yel. (*syn.* dubia).
clusiana, 6″, Je., wh.
davurica, 1′, hdy. shr., wh. (*syn.* fruticosa var. davurica of some).
flagellaris, 2′, Je., creeping, yel.
Fragariastrum, 4″, Mch., procumbent, wh.
gracilis, 1′ to 2′, Jy., yel.
grandiflora, Je., yel.
hippiana, 1½′, Jy., yel.
hirta, 1′, sum., pale yel. (*syn.* pedata).
lanuginosa, 6″ to 12″, Jy., yel.
micrandra, 1′ to 2′, sum., hdy. shr., yel.
minima, 3″, My., yel.
multifida, 6″, Jy., yel.
nivalis, 3″ to 6″, Jy., wh.
nivea, 1′, Je., yel.
palustris, 2′, Je., pur. (*syns.* Comarum and C. palustre).
parvifolia, Je., hlf-hdy. shr., yel.
pennsylvanica, 1½′, Je., yel. (*syn.* missourica).
pyrenaica, 8″ to 18″, sum., yel.
recta, 1′, sum., pale yel., several vars.
reptans, 4″, Je., creeping, yel.
— flore pleno, double flowers.
— variegata, variegated lvs.
rupestris, 6″ to 12″, My., wh.
russelliana, 1′, sum., sc., hybrid.
Sibbaldia, 3″ to 6″, Jy., yel. (*syn.* Sibbaldia procumbens).
splendens, 6″, Mch., wh.

Thurberi, 1′, Je., red.
Tormentilla, 6″ to 24″, Je., yel.
tridentata, 6″, My., wh.
Valderia, 1′, sum., yel., wh.
verna, 6″ to 9″, spr., yel.

Selection of Hybrid Potentillas :—

Belzebuth, dark red.
Cameleon, sc., striped pur., yel.
Candidat, yel., red.
Drap d'Or, or., yel.
Feu Follet, vermilion, yel. edge.
Le Vésuve, red, yel.
Louis Van Houtte, deep crim.
purpurea plena, deep crim., yel.
variabilis, crim., yel.
versicolor, red, yel., striped and blotched.
Victor Lemoine, red, striped yel.

POTERIUM. (Burnet.)

Hardy perennial herbs (*ord.* Rosaceæ), with heads or spikes of small flowers. Propagation, by division of the rootstock in spring. Seeds may also be sown. Ordinary garden soil. The leaves of Sanguisorba smell pleasantly of Cucumber, and are sometimes used in salad; hence the name Salad Burnet.

Principal Species and Varieties :—

alpinum, 1′ to 2′, Je., yel. (*syn.* Sanguisorba alpina).
canadense, 3′, Aug., wh. (*syn.* Sanguisorba canadensis).
dodecandrum, 3′ to 4′, Jy., pur. (*syn.* Sanguisorba dodecandra).
officinale, 2′ to 3′, Jy., pur. (*syn.* Sanguisorba officinalis).
— neglectum, 4′, Jy., wh.
— rubrum, 3′ to 4′, Jy., red.
Sanguisorba, 6″ to 15″, Jy., Aug., grn., red. Salad Burnet.
sitchense, 3′, Jy., sc.

POTHERBS.

Formerly various herbs were much grown for medicinal purposes; now their chief use is for flavouring purposes in cookery. A herb border or a small piece of the kitchen garden is usually set apart for their cultivation, thus keeping them together for convenience of gathering. Annuals and biennials are propagated by annual sowings of seed; the perennials by division of the rootstock in most cases. (For special uses and details of treatment, *see* under their respective headings).

Principal Potherbs :—

Annuals.—Basil (Ocimum basilicum), Blessed Thistle (Cnicus benedictus), Borage (Borago officinalis), Chervil (Anthriscus cerefolium), Coriander (Coriandrum sativum), Marigold, Pot (Calendula officinalis), Marjoram, Summer or Sweet (Origanum Majorana), Purslane (Portulaca oleracea), Savory, Summer (Satureia hortensis).

Biennials.—Angelica (Archangelica officinalis), Parsley (Carum Petroselinum). Many of the above annuals may be treated as biennials.

Perennials.—Balm (Melissa officinalis), Burnet, Salad (Poterium Sanguisorba), Caraway (Carum Carvi), Chamomile (Anthemis nobilis), Chives (Allium Schœnoprasum and A. S. sibiricum), Dill (Peucedanum graveolens), Fennel (Fœniculum vulgare), Garlic (Allium sativum), Horehound (Marrubium vulgare), Hyssop (Hyssopus officinalis), Lavender (Lavandula vera), Liquorice (Glycyrrhiza glabra), Marjoram, Common (Origanum vulgare), Marjoram, Pot (O. Onites), Marjoram, Winter (O. heracleoticum), Pennyroyal (Mentha Pulegium), Peppermint (M. piperita), Rue (Ruta graveolens), Sage (Salvia officinalis), Savory, Winter (Satureia montana), Scurvy Grass (Cochlearia officinalis), Spear Mint (Mentha viridis), Tansy (Tanacetum vulgare and T. v. crispum), Tarragon (Artemisia dracunculoides), Thyme (Thymus vulgaris), Thyme, Lemon (T. Serpyllum citriodorus), and Wormwood (Artemisia Absinthium).

POTHOS.

Epiphytal stove climbers (*ord.* Aroideæ), valued for their foliage, the spathes being usually small and green. Propagation, by suckers. Soil, loam and peat, both fibrous and lumpy, with nodules of charcoal and sand. The compost must be open. They delight in atmospheric moisture and a little shade. The descriptions refer to the leaves.

Principal Species :—

argenteus, silvery grey, grn. midrib.
aureus, variegated yel.
celatocaulis, clings close to wall or other support.
enderianus, blk., olive.
flexuosus, grn., stems rooting, flattened.
nigricans, glossy blk., olive.
nitens, lvs. bronzy pur., grn.
scandens, cl., grn.

POTS.

Flower pots are made in various sizes. The smallest size, termed thimbles, are used for raising Orchid seedlings and other small, slow-growing subjects. Thumb pots may be of various sizes under 3″ in diameter at the top, and with or without rims. Seedling Palms, for instance, require deep pots to hold the roots, but they should be narrow and without rims for economy of space. Pots are made in casts of a given number according to size, and by the old method of classifying them a 3″ pot was made in casts of 60, and in garden phraseology termed 60's, or 60 size pots. Pots with rims are generally of the same depth as width, inside top measurement. Without rims they are generally a little deeper in proportion to width. Modern requirements necessitate pots of more varied size than formerly; some are made by hand, others by machinery, so that great variation is found in the size of different casts by different makers. To show the variation in size and cast, two sets are here appended, the old style and a modern make :—

Width at Top.	Pots in Cast.	Width at Top.	Pots in Cast.
3″	60 (60's)	2¼″	60
5″	48 (48's)	2¾″	52
6″	32 (32's)	3″	48
8″	24 (24's)	3½″	42
9″	16 (16's)	4½″	33
11″	12 (12's)	6″	24
12″	8 (8's)	8″	12
13″	6 (6's)	9″	8
15″	4 (4's)	10″	6
18″	2 (2's)	12″	3
—	—	15″	1

Upright pots have at various times been used where depth rather than width was desired. Thumbs for Palms, as mentioned above, are an instance. Large Palms have also been successfully grown in pots measuring 10″, 12″, or of even greater diameter top and bottom, but several inches deeper. Bulbs of various kinds have also been grown in these upright pots, but as the large sizes never have become generally popular, they have to be made to order.

Glazed pots are considered by many florists as amenable as the ordinary porous type, and probably only the primary expense and a little prejudice prevent them from coming into general use.

Pothuava (*see Æchmea*).

Specially made Orchid pots are much shallower than the ordinary forms; but otherwise they are similar, except in those cases where they are perforated at the sides, or are of special patented designs.

Seakale and Rhubarb pots are like bell-glasses, with a round lid attached to the knobs or handles. When they are placed over Seakale or Rhubarb crowns, and covered with manure to force them where they grow, it is only necessary to remove the dung from the top to get at the lid for cutting or pulling the produce.

Wooden and slate tubs would be more economical for large plants than earthenware pots. Pot baskets are wooden baskets for Orchids, of pot shape.

POTTING.

Condition of the Pots.—When potting or repotting plants of any kind, dirty receptacles should not be used. Pots that have been emptied should be placed in a tub of water. When extensive potting operations are proceeding a boy should be kept washing, so that the pots may be used again whenever they are sufficiently dry. If dirty pots are used, the ball of soil often gets broken and the roots injured when turning them out. New pots should be steeped before use.

When to Pot.—The precise time will depend upon the kind of plant, its stage of growth, and the season. The potting of seedlings from seed pans or boxes will depend upon the size at which it is most advantageous to perform this operation. Cuttings of most plants should be well rooted before they are disturbed. Seedling Chinese Primulas, Calceolarias, and Cinerarias should be repotted from time to time, never allowing them to become potbound till in their final or flowering pots. The same applies to winter-flowering and many other plants being grown from cuttings, the secret of success being to keep them growing till they have attained the desired size. Plants that have been cut back or pruned should be kept drier for a time, and afterwards encouraged to make fresh growth by placing them in a moist, warm house and frequently syringing them. When the buds begin to grow is the time to repot the plants. Cattleyas, Dendrobiums, Angræcums, and most other epiphytal Orchids should be repotted, if necessary, when the young roots begin to develop after the flowering period. Odontoglossums and various other cool-house Orchids may be repotted in early autumn or in February, so that they may have time to become established before the advent of hot weather.

Procuring and Preparing Soils.—In and around large towns it is generally necessary to procure different kinds of soil from the horticultural sundriesman. On rural estates and others of any size it is generally possible to get turf from an old pasture, the main object being to obtain plenty of fibre in it. The loss to the pasture may be made good by giving it a good coat of manure, digging or ploughing it down, and sowing the ground with grass seeds. Useful soil of a light nature may often be obtained by collecting the parings of roadsides and the scouring of ditches. Being of a porous, sandy nature it is useful for a great variety of soft-wooded plants. By observation and judgment a gardener may often procure loam of different qualities, light and heavy, well permeated with the fibrous roots of grass. These may be stacked in different heaps for six or twelve months, to become mellow before use. A layer of farmyard manure may be placed between every two layers of turf, to enrich it for plants that require it. Peat for Heaths, Azaleas, and Rhododendrons should be procured in the form of thin turves from dry heaths or moorlands covered with short Ling or Heather, in order that plenty of fibre may be present. It should be stacked like loam. Bog peat is only useful for Rhododendrons in the open ground after it has lain for some time and been turned once or twice to mellow it. Brown peat for Orchids has to be procured from peaty heaths that are dry and springy with the roots of Bracken.

Condition of the Soil.—Much potting has to be done in the early part of the year, when the stacks may be saturated with moisture. Soil should not be used in such condition, but partly dried by storing a quantity of each kind under the potting benches or in a dry shed for some time previous to the commencement of operations. For soft-wooded and all tender plants, during the early months of the year the soil should be warmed by placing it in the plant house over-night before use. It should be sufficiently dry to crumble readily when a handful has been squeezed and laid down. No soils should be sifted except for seeds, but broken up by hand or the trowel so that it will be lumpy, the size of the lumps depending upon that of the pots.

Draining.—All pots should be well drained with potsherds carefully placed by hand. The quantity of drainage will depend upon the size of the pots and the kind of plant. Those requiring much water, or which have to remain many months or years in the same pot, should have plenty of drainage.

Top-dressing.—In some cases it will be advisable to remove the surface soil from pots and replace it with rich and fresh material to save repotting; but this may be discussed under the plants that require it.

POUROUMA.

A stove tree (*ord.* Urticaceæ) with evergreen foliage and allied to the Bread Fruit (Artocarpus). Edulis, the only introduction, is fit for the economic house of a botanic garden only.

POURRETIA.

Stove herbs (*ord.* Bromeliaceæ) with lanceolate or strap shaped leaves. The members of the genus, named as above by Ruiz and Pavon, are now placed in Puya (which *see*). Other species added by different botanists are now referred to Pitcairnia, Tillandsia, etc. Achupalla and coarctata are species of Puya. Frigida is Dyckia frigida. (*See* DYCKIA, PITCAIRNIA, PUYA, and TILLANDSIA.)

PRASOPHYLLUM.

Terrestrial Orchids (*ord.* Orchidaceæ) with a solitary leaf, a tuberous rootstock, and unattractive flowers.

PRATIA.

Slender, creeping, perennial herbs (*ord.* Campanulaceæ), rarely erect. Propagation, by seeds and cuttings in heat in spring, at which time the

Pot Marigold (*see Calendula*).

Poupartia (*see Spondias*).
Prairie Clover (*see Petalostemon*).
Prairie Dock (*see Silphium terebinthaceum*).
Prairie Rose (*see Rosa setigera*).

creeping species may be divided. Cuttings in sand root readily in a cold frame from July till September. Soil, fibrous loam and peat or leaf mould, with sand. The favourite species, angulata, is a pretty, creeping, rock plant, with white flowers followed by red berries, and is hardy in the south of England; the rest require a pit or greenhouse from which frost is excluded.

Principal Species :—

angulata, 1″, sum., wh. (*syn.* Lobelia littoralis, *see* figure 2).
arenaria, 1″, Sep., wh.
begoniæfolia, sum., bl. (*syn.* Lobelia begoniæfolia).
erecta, 1′, Je., bl.
repens, 1″, sum., aut., wh., vio.

PREMNA.

Tall stove shrubs (*ord.* Verbenaceæ), of little horticultural interest. Propagated by seeds or by cuttings. Soil, loam and peat, with sand.

Principal Species :—

esculenta, 8″, My., yel., wh.
integrifolia, 10′, Jy., grn., wh. (*syns.* serratifolia and spinosa). Headache Tree.
latifolia, 15′, Je., wh.

Principal Species :—

densiflora, 9″, wh.
plantaginifolia, 1′, grn., wh.
stachyodes, 2′, grn. (*syn.* colorans).

PRESLIA.

A hardy, procumbent herb (*ord.* Labiatæ), suitable for the rockery. Propagation, by division in spring, and by cuttings in summer under a hand-light. Ordinary garden soil. Cervina, June, pale purple, is the only species (*syns.* glabriflora, villiflora, and Mentha punctata).

PRESTOËA.

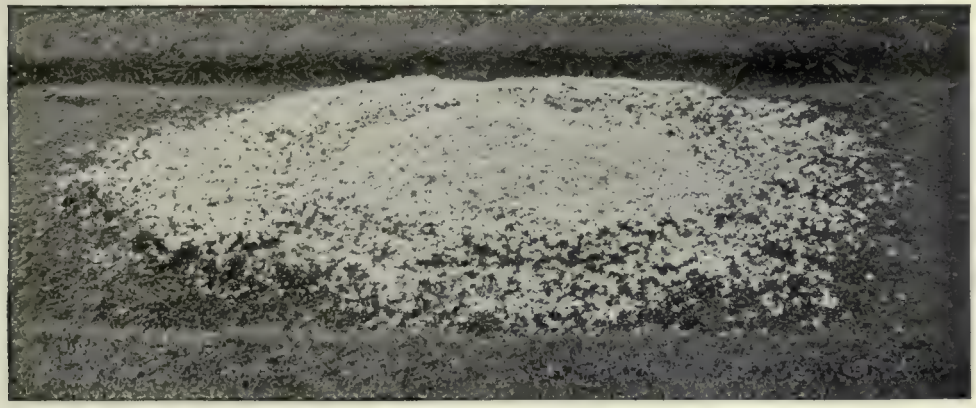
Stove Palms (*ord.* Palmæ) of small size, with finely divided leaves. Propagation, by imported seeds. Soil, fibrous loam with a third of peat and sand.

Principal Species :—

Carderi, 10′, lvs. 1′ to 3′.
montana, 10′, lvs. 1′ to 3½′.
pubigera, 12′, lvs. 1′ to 4′.
trinitensis, 8′, lvs. 1′ to 3′.

PRESTONIA.

Evergreen stove twiners (*ord.* Apocynaceæ), with white, yellow, or rosy flowers. Propagation, by



Pratia angulata.

PRENANTHES.

Hardy herbs (*ord.* Compositæ). Propagated by division in autumn or spring. Any well-drained garden soil. The best known species are alba, 4′, autumn, white; purpurea, 4′, August, purple; and virgata, 4′, August, lilac. (For arborea and pinnata, *see* Sonchus.)

PREPUSA.

Perennial stove herbs (*ord.* Gentianeæ). Propagation, by seeds and division in spring. Soil, loam and one-third of leaf soil, with sand. Hookeriana, 1′, March, white and crimson, is the best known.

PRESCOTTIA.

Terrestrial stove Orchids (*ord.* Orchidaceæ), bearing small flowers in dense spikes. Propagation, by division when commencing to grow. Soil, equal proportions of fibrous loam and peat, with sand, and a surfacing of sphagnum.

Preptanthe (*see Calanthe*).

cuttings of short side shoots getting firm at the base, in sand, in a case or under a bell-glass. Soil, fibrous loam, with some good fibrous peat and sand.

Principal Species :—

glabrata, 8′, Jy., wh.
hirsuta, 10′, yel., ro. (*syns.* Echites hirsuta and hirtella).
tomentosa, 8″, Jy.

PRICKING OUT.

This term is applied to the transplanting of seedlings from pans, boxes, or beds. The operation is done with the object of giving the seedlings more room to grow either in boxes or frames. The soil in the seed pans may have become sour through overwatering or the length of time the seeds have taken to germinate, or the seedlings may have commenced to damp off, as Stocks often do; hence the reason for having the operation done early. Very small seedlings, being difficult to handle, are best pricked out with a small peg. Tuberous Begonias may require to be pricked out a second time into boxes before they are large enough to be potted. Bedding plants seldom require this more than once.

PRIESTLEYA.

Dwarf, evergreen shrubs (*ord.* Leguminosæ), with yellow flowers and the habit of a Genista, and plenty of sand, firm potting, and good drainage, will suit them. Priestleyas require less water than most plants.

Photo: Cassell & Company, Ltd.

PRIMULA KEWENSIS (*see p.* 235).

requiring similar treatment. Half-ripened shoots will root readily in sand under a bell-glass. Fibrous loam and peat in equal proportions, with

Prickly Cedar (*see Cyathodes acerosa*).
Prickly Date Palm (*see Acanthophœnix*).
Prickly Pear (*see Opuntia*).
Prickly Rhubarb (*see Gunnera*).
Prickly Thrift (*see Acantholimon*).
Prickwood (*see Cornus sanguinea and Euonymus europæus*).

Principal Species:—

capitata, 3′, Jy.
graminifolia, 3′, Je.
myrtifolia, 3′, Je.
vestita, 3′, My. (*syns.* Liparia vestita and villosa).

PRIMULA.

Description.—The genus Primula comprises some of the most beautiful and useful of garden plants. It is only necessary to think of the native Primrose, with its cultivated varieties, the Auricula, the Chinese Primula (sinensis), and the useful

SUTTONS' BLUE PRIMULA.

obconica to realise the high position the genus really occupies in gardens. Besides the 136 species named in *Index Kewensis*, the ease with which cross fertilisation is effected and the great variation from seed have yielded many beautiful varietal forms superior to the typical plants. Thus sinensis has been improved almost beyond recognition in form, size, and colour; while the free-blooming obconica now yields most interesting results, though its value is discounted to some extent by the irritating effect contact with it has upon a certain number of those who touch it. Auricula, probably a hybrid itself, has for many years been a favourite with specialists. Sieboldi has also given many beautiful varieties, and among the Alpine Primulas natural and artificially obtained hybrids abound. Colour variation and selection have greatly improved several of the Primulas, and in this connection may be cited the improvements in the colours of the Chinese Primula. The recent appearance on the Continent of one with yellow and white flowers foreshadows the achievement of a good yellow Chinese Primula. The Stellata forms are at present very popular on account of their free habit and small flowers.

Propagation.—The propagation of all the hardy species is effected by means of seeds, sown when ripe or in spring, in pans of light soil, slightly covered with fine earth, and placed in a frame or cool greenhouse. A season is gained by sowing when the seeds are ripe. When the seedlings appear, which is at irregular intervals, they ought to be shaded from strong sun, carefully watered, and given plenty of air. As soon as large enough they should be pricked off about 2″ apart into other pans or a cold frame. They are also propagated by division after flowering, and many of the Alpine species can only be kept alive if divided regularly. Sinensis and obconica are raised from seeds sown in a gentle hotbed or in pans from March to June in a compost of two parts of leaf soil, one of loam, and one of silver sand, put through a ¼″ sieve. The seeds should be just covered with very fine soil, carefully watered, and covered with brown paper until the seedlings begin to appear, when they should be gradually exposed to the light, but not to the sun. Place the pots in a temperature of 50° to 60°, prick off the seedlings when fit, and grow on in a rather lower temperature. The old double white sinensis and other good forms are propagated by cuttings taken in April or May.

Soil.—The greater number of the hardy species like a soil composed of loam, leaf soil, or peat, with some sharp sand and grit intermingled. Some, however, like a moist, peaty soil. The Chinese and other tender Primulas should have their final shift into a compost of about two parts of good loam to one part each of leaf mould and well-rotted cow manure, with some sharp sand.

Other Cultural Points.—The hardy species require the same attention as other Alpine plants, though some are very troublesome to grow. Many prefer shade, though less is needed if plenty of water is given and they are in a somewhat retentive but well-drained soil. Japonica does well in either a moist, peaty soil, or in a heavy loam. Sieboldi, when grown outside, is easily destroyed in winter through the crowns being under the surface, and the places where the plants are ought always to be marked with a good stout peg. It is a fine plant for a cool house. Sinensis should have a temperature of 50° to 55° when in bloom in winter or spring, but the double varieties prefer one a little higher. All require to be kept near the glass in a light and well-ventilated house. Obconica will bear a rather lower temperature. Careful potting is needed, so that the crowns are neither in a hollow nor too high above the soil.

Principal Species, Hybrids, and Varieties :—

[NOTE.—All are hardy save where otherwise stated.]

acaulis (*see* vulgaris).
Auricula, 3″ to 6″, spr., various (*see* Auricula).
cortusoides, 6″ to 10″, sum., ro.
denticulata, 8″ to 12″, spr., lil.
— alba, wh.
— cashmeriana, under surface of lvs. pale pur. with golden farina.
— pulcherrima, deep lil.
— variegata, lvs. bordered with wh.
elatior, 1′, Ap., yel., various forms. Oxlip.
floribunda, 4″ to 8″, spr., grh., yel.
— grandiflora.
— isabellina, pale yel.
japonica, 1′ to 1½′, spr., varying red, wh., pk., pur.
— splendens, crim.
kewensis, 9″ to 15″, spr., yel. hybrid (verticillata × floribunda, *see p.* 234).
marginata, 2″ to 4″, Ap., vio. ro.; several vars., cærulea, grandiflora, and major are good.
minima, 1½″, sum., ro. or wh.
obconica, 6″ to 12″, spr., grh., lil.; many seedling vars. are better than the type (*syn.* poculiformis).
officinalis, 4″ to 12″, spr., yel.; several forms and colours (*syn.* veris). Cowslip.
rosea, 4″ to 6″, spr., rosy car.; moist soil.
— grandiflora, } larger and
— superba, } brighter.
sikkimensis, 1½′ to 2′, sum., best as bien., yel.; moist soil.
Sieboldi, 8″ to 12″, Ap., ro., wh. (*syn.* grandiflora, *see* Selections).
sinensis, 9″, spr., grh., wh., lil. (*syn.* prænitens, *see* Selections). Chinese Primrose.
variabilis (*see* Polyanthus).
verticillata, 1′ to 1½′, spr., grh., yel.
veris (*see* officinalis).
viscosa, 2″ to 4″, sum., rosy pur., eye wh. (*syn.* villosa). Good vars. are ciliata, larger flowers; commutata, ro.; confinis, deep ro.; decora, rosy pur. (*syn.* decora); iberica, lil.; latifolia, vio.; Nelsoni, pale pur.; pedemontana, rosy pur.; and purpurea, crim. pur.
vulgaris, 3″, spr., yel.; many garden forms and colours (*syn.* acaulis, *see* Selections). Common Primrose.

Other Species, Hybrids, and Varieties :—

admontensis, 3″ to 6″, My., lil., hybrid (*syns.* Churchilli and clusiana dentata).
algida, 3″ to 6″, spr., pur.
Allionii, 4″ to 6″, Ap., mauve, eye wh.
alpina, 4″ to 8″, My., vio. pur., hybrid (*syns.* intermedia of gardens and rhætica).
altaica, 3″ to 6″, spr., mauve.
amethystina, Je., grh., red, pur.
Arctotis, spr., wh. or lil., pur., hybrid.
— hybrida, various.
Auricula bellunensis, 6″ to 9″, My., yel.
— dolomitica, 3″ to 6″, lemon yel.
auriculata, 4″, sum., pur., wh. eye (*syn.* longifolia of *Botanical Magazine* 392).
Balbisii, My., yel. (*syn.* Auricula Balbisii).
bella, sum., hlf-hdy., vio. pur.
Berninæ, Ap., rosy pur., hybrid.
biflora, 1″, spr., ro., hybrid.
blattariformis, 8″ to 12″, grh., lil.
bracteata, Mch., hlf-hdy. or grh., yel.
bullata, Ap., hlf-hdy. or grh., yel.
calliantha, Je., hlf-hdy. or grh., vio. pur.
calycina, My., pur. (*syn.* glaucescens).
capitata, 6″ to 9″, Ap., hdy. or frame, vio., bl.
carniolica, 3″ to 5″, Ap., bl. (*syns.* Freyeri and jellenkiana).
— multiceps, larger, darker flowers.
cernua, Jy., hlf-hdy., bl. or pur.
clusiana, 6″ to 9″, Ap., ro.

cridalensis, Ap., rosy pur., hybrid.
daonensis, My., ro., eye wh. (*syn.* œnensis).
davurica, 3″, My., pk., eye yel. (*syn.* intermedia of *Botanical Magazine* 1219).
Delavayi, 1′, Aug., hlf-hdy., pur.
dinyana, 3″ to 6″, spr., pur., hybrid.
discolor, 3″ to 6″, Ap., pale pur. or lil., hybrid.
dryadifolia, Jy., probably hdy., vio.
Dumoulinii, 2″ to 3″, spr., ro., hybrid.
elliptica, 6″ to 12″, Je., vio.
elwesiana, 6″ to 8″, pur.
erosa, 4″ to 8″, Mch., Ap., pur. or lavender.
Escheri, 2″ to 4″, Ap., ro., hybrid.
Facchinii, 3″ to 5″, My., hybrid, rosy pur.
farinosa, 3″ to 12″, sum., pale pur., eye yel.
— alba, wh.
— mistassinica (*syns.* mistassinica and pusilla of *Botanical Magazine* 3020).
— scotica, 2″ to 4″, Je., pur., yel. eye.
Fedtschenkoi, 6″ to ″, sum., hlf-hdy., pur.
flörkeana, 2″ to 4″, spr., lil. pur., hybrid (*syn.* minima hybrida).
Forbesii, 1¼′ to 1½′, hlf-hdy. ann., pale lil., eye yel. (*see p.* 237).
Forsteri, 2″ to 4″, spr., aut., ro., eye wh., hybrid.
frondosa, 2″ to 6″, Je., bl.
gambeliana, hlf-hdy., pur.
geraniifolia, 6″ to 10″, My., hlf-hdy., pur.
glacialis, Je., probably hdy., vio.
glutinosa, 4″, sum., bl., pur.
grandis, 9″ to 18″, sum., yel.
Heerii, 3″ to 4″, Ap., pur.
Hugueninii, 3″, Ap., pur., hybrid.
Huteri, 1″, My., vio., hybrid.
imperialis, 3′ to 4′, grh., yel., or.
integrifolia, 3″, spr., ro. (*syn.* candolleana).
involucrata, 5″ to 8″, spr., cream, wh.; moist soil.
— cœrulea, bl.
— Munroi, 6″ to 8″ wh., eye yel. (*syn.* P. Munroi).
kaufmanniana, 6″ to 12″, sum., vio.
Kerneri, 2″ to 4″, Ap., vio., hybrid.
kitaibeliana, Ap., rosy pur.
lebliana, 3″ to 4″, Ap., pur., hybrid.
longiflora, 1′ to 1½′, My., pur. (*syn.* farinosa var. of Scopoli).
longobarda, Ap., rosy pur.
luteola, 1½′ to 2′, sum., yel.; moist soil.
magiassonica, 4″, My., pur.
megasæfolia, 6″, win., spr., hdy. per., ro.
minutissima, 1″, Je., pur.
mollis, 1′ to 1½′, My., hlf-hdy., red.
muretiana, 2″ to 4″, Ap., pur., hybrid (*syn.* Mureti).
muscoides, 2″, pur.
— tenuiloba (*syn.* tenuiloba).
nivalis, 4′ to 15″, spr., lil. pur.
— or nivea of gardens is pubescens alba.
obovata, 4″, Ap., ro. or pur., hybrid.
Obristii, Ap., yel., hybrid.
obtusifolia, 6″ to 10″, Je., pur. or yel.
Olgæ, 3″, spr., lil. or pur.
Palinuri, 6″ to 10″, My., hlf-hdy., yel.
Parryi, 6″ to 18″, spr., pur., eye yel.
petiolaris nana, hlf-hdy., lil. pur., eye whitish yel.
Peyritschii, sum., pur. (*syn.* viscosa major of British gardens).
pinnatifida, Jy., hlf-hdy., vio.
Plantæ, Ap., rosy pur., hybrid.
Poissoni, 6″ to 12″, Jy., hdy. or hlf-hdy., pur.
Portæ, Ap., red, hybrid.
prolifera, 6″ to 24″, grh., yel.
pubescens, 3″ to 6″, Ap., rosy crim., hybrid.
— alba, wh. (*syns.* nivalis and nivea of gardens).
pulchra, hdy. or hlf-hdy., pur.
pumila, 1″, Ap., rosy pur., hybrid.
purpurea of Royle is Stuartii purpurea.
pusilla, spr., vio. pur. (Wallich, not *Botanical Magazine* 3020).
Reedii, My., wh.
reticulata, 6″ to 12″, My., yel.
rotundifolia, 9″ to 12″, Je., hdy. or hlf-hdy., pur. or pk.
Rusbyi, 6″ to 9″, spr., hdy. or hlf-hdy., pur., eye yel.
salisburgensis, 4″ to 6″, Ap., reddish pur., hybrid.
sapphirina, 1″ to 2″, pale bl.
secundiflora, Jy., vio.
septemloba, Jy., pur.
serratifolia, Je., yel.
serratifolia of Europe, pur., hybrid.
sibirica, 3″, My., red.
— finmarchica, dark lil. (*syn.* norvegica).
— integerrima, lvs. entire.
— kashmiriana, 6″, rosy lil. (*syn.* elegans).
similis, Ap., pur., hybrid.
soldanelloides, wh.
sonchifolia, Je., hdy. or hlf-hdy., vio.
spectabilis, 4″, Jy., rosy pur.
spicata, Je., hdy. or hlf-hdy., vio.
Steinii, Ap., pur., hybrid.
stricta, Ap., pk. (*syn.* hornemanniana).
Stuartii, 9″ to 18″, sum., yel.
— purpurea, sum., pur. (*syn.* jæschkiana).
Sturii, Ap., rosy pur., hybrid (*syn.* minima pubescens).
suffrutescens, spr., rosy pur., eye yel.
tenella, 2″, hdy. or hlf-hdy., bl., wh.
Traillii, 9″, sum., hdy. or hlf-hdy., wh.
uniflora, lil.
venusta, 3″, Ap., pur.
Venzoi, Ap., pale pur., hybrid.
vinciflora, hlf-hdy., pur. vio.
Steinii, Ap., pur., hybrid.
wulfeniana, Ap., vio. pur. (*syn.* spectabilis wulfeniana.)
yunnanensis, Jy., vio. pur.

Selections :—

[NOTE.—Naming these is not to be held as implying that others are inferior. There are many excellent strains of sinensis to which raisers have given names.]

Chinese Primulas :—

Brilliant Rose, ro.
Cambridge Blue, bl.
Crimson King, crim.
Double White, old.
— alba magnifica, wh.
— Blue, bl.
— Pink, pk.
— Scarlet, sc.
Fern-leaved, Snowdrift, wh.
— Rosy Queen, ro.
— various.
Pink Queen, pk.
Reading Blue, dark bl.
Royal White, wh.
Stellata in var.

Japanese Primroses (P. Sieboldi) :—

alba magnifica, wh.
Beauty of Sale, wh., edged ro.
Bruce Findlay, heliotrope.
Distinction, wh., ro.
Empress, rosy crim., eye wh.
Fascination, whitish lavender, fringed.
Harry Leigh, lil., eye wh.
lilacina superba, lil., eye wh.
Magenta Queen, magenta.
Miss Kelly, rosy pk., eye wh.
Ruby Queen, car. red.
Vivid, bright magenta.

Primroses (P. vulgaris) :—

alba flore pleno, double, wh.
Blue Primroses in var.
Croussei flore pleno, plum, edged wh.
Evelyn Arkwright, yel.
Harbinger, single, wh.
lilacina flore pleno, double, lil.
lutea flore pleno, yel. Cloth of Gold.
Miss Massey, single, crim.
platypetala pleno, double, mauve crim.
purpurea flore pleno, double, reddish pur.
rosea, flore pleno, double, ro.
rubra, flore pleno, double, crim. Old Velvet Crimson.
sulphurea flore pleno, double, sulphur.
White Bedder, single, wh.

PRIMULINA. (ROCK TOBACCO.)

A neat, hardy Alpine plant (*ord.* Gesneraceæ), difficult to cultivate. Propagation, by seed sown in spring, or by division after flowering. Soil, loam and leaf soil with a little sharp sand, in a pot in a frame.

Only Species :—

Tabacum, 6″ to 9″, Jy., wh., pur. (*syn.* sinensis).

PRIONIUM.

A tall stove herb (*ord.* Juncaceæ) like a giant Woodrush. Propagation, by imported seeds and

Prinos (*in part, see Ilex*).
Prinos integrifolius (*Nemopanthus canadensis*).

offsets. Soil, good fibrous loam, a little leaf mould, and sand. The base of the pot containing it should dip into a tank.

Only Species :—

Palmita, 6′ to 12′, brownish (*syn.* serrata).

PRISMATOCARPUS.

Greenhouse perennials (*ord.* Campanulaceæ), allied to Campanula. Propagation, by seeds, and by cuttings of half-ripened shoots under a bell-glass in summer. Soil, fibrous loam, with one-

Photo : Cassell & Company, Ltd.

Primula Forbesii (*see p.* 236).

fourth of leaf mould and plenty of sand. Many species placed here belong to Specularia (which *see*).

Principal Species :—

nitidus, 6″ to 12″, Aug., wh. (*syn.* Campanula Prismatocarpus).

PRITCHARDIA.

Stove Palms (*ord.* Palmæ), with fan shaped leaves of bold and noble aspect, more or less deeply cut into finger-like segments at the margins. Propagation, by imported seeds sown in boxes of sandy soil and leaf mould, and placed on the hot-bed of a propagating pit. Soil, fibrous loam, one-third of peat, and sand. Leaf mould might be substituted for the peat, but small pots and firm potting must be observed where the desire is to keep the plants of a suitable size for decorative work as long as possible. Night temperature in winter 60°, rising 10° by day; in summer 75°, rising to 85° or 90° with sun heat.

Principal Species :—

aurea, petioles yel.
filifera (now Washingtonia filifera).
Gaudichaudii, lvs. roundish, plaited, cut one-third down (*syn.* macrocarpa).
grandis (now Licuala grandis).
macrocarpa (*see* Gaudichaudii).
Martii, lvs. like Gaudichaudii, but smaller and more slender.
pacifica, lvs. arching and convex, massive.
Pericularum, lvs. fan shaped, like vuylstekiana, but petioles brownish golden.
Thurstoni, lvs. fan shaped, very deeply cut.
Veitchii (now Licuala Veitchii).
vuylstekiana, lvs. palmate, much cut, deep grn.

PRIVA.

Hardy or half-hardy perennial herbs (*ord.* Verbenaceæ) with terminal spikes of purple flowers. Propagation, by seeds in gentle heat in spring. Soil, fibrous loam, with one-fourth leaf mould and some sand. Of the few known species lævis, 1½′, summer, rosy lilac, is the only introduction.

PRIVET.

Description. — The common Privet, Ligustrum vulgare (*ord.* Oleaceæ) has been widely cultivated in British gardens for many years, probably since courtyards of dwelling houses became common.

Propagation. — Chiefly effected by cuttings, especially in the case of varieties, as it keeps them true. The type may also be raised from the berries, which should be stratified like haws for a year before sowing. The seeds should never be dried, as it retards germination.

Soil.—Any garden soil will suit, the best being a good loam.

Other Cultural Points. — Plants from cuttings are of more rapid growth than those from seeds, and may be planted for concealing unsightly objects of any kind about the garden or dwelling house, being very suitable for town gardens. Privet succeeds in shade, but grows most strongly in an open situation, and is almost evergreen where sheltered. Hedges of it may be clipped twice a year, in winter and June or July. There is an evergreen or Italian variety (vulgare italicum), and there are white, yellow, and green-berried varieties, as well as the black-berried type, all of which may be used for decorative work in association with autumn tinted foliage and other berries.

Special Forms.—In recent years the oval-leaved Privet (ovalifolium) has come much into vogue for hiding unsightly objects in town and country gardens. The Golden Privet (o. foliis aureis) was little known about twenty years ago, but since then has become exceedingly popular for cottage and villa gardens, especially in the suburbs of large towns, where it makes beautiful golden hedges, retaining its leaves in mild winters till growth is again well advanced. Sinense is a very handsome species for the shrubbery, on account of the profusion of its white flowers. Japonicum also flowers freely, but it is a slow-growing, evergreen

bush of spreading habit. Coriaceum has rounded, wavy, evergreen leaves. The dark green shining leaves of lucidum are handsome, but the plant is a little more tender than the above; it has two variegated forms. Several other Privets are useful in shrubberies. (*See also* LIGUSTRUM.)

PROCHNYANTHES.

Tuberous-rooted herbs (*ord.* Amaryllideæ) with the flowers, in most cases, in pairs. Propagation, by seeds and by offsets. Soil, fibrous loam, with one-fourth of leaf soil, and plenty of sharp sand.

Principal Species :—

bulliana, 2′ to 3′, Sep., whitish yel., in five to six pairs (*syn.* Bravoa).

PROCKIA.

Evergreen stove shrubs (*ord.* Tiliaceæ), now seldom seen in cultivation. Propagation, by cuttings getting firm at the base, in pots of sand under a bell-glass placed in heat. Soil, fibrous loam, with a little peat and a dash of sand.

Principal Species :—

crucis, 5′, Jy., yel.
serrata (now Thiodia serrata).
theæformis, 6′, Jy., yel.

PRONAYA.

Twining, greenhouse sub-shrubs (*ord.* Pittosporeæ), with evergreen foliage and berried fruits, allied to Sollya. Propagation, by half-matured shoots in sand under a bell-glass in gentle heat. Soil, equal parts of fibrous loam and peat, with sand. Elegans, 4′, August, blue, seems to be the only species introduced (*syns.* speciosa and Spiranthera Fraseri).

PROSERPINACA. (MERMAID WEED.)

Aquatic herbs (*ord.* Halorageæ) that may be grown outdoors in summer, and kept in a frame or cool greenhouse in winter. Propagation, by cuttings in sand or sandy soil in water. In open-air tanks they may be grown in pots, pans, or baskets just immersed in the water, or planted out in soil if the water is shallow. Palustris and pectinata, the only known species, have small white flowers, during summer. The leaves of the last named are finely cut and pretty.

PROSOPIS.

Evergreen stove shrubs and trees (*ord.* Leguminosæ), with bipinnate and graceful leaves. Propagation, by side shoots taken off with a slight heel, in sand in a propagating case. Soil, equal proportions of fibrous loam and peat, with sand. Juliflora, 30′, white, the Algarobo, is the one most often seen in gardens.

PROSTANTHERA.

Greenhouse shrubs (*ord.* Labiatæ) with evergreen leaves, and notable, in the order, for their round shoots. Propagation, by seeds in heat during spring. Half-ripened shoots in sand under a bell-glass root readily. Soil, loam and peat in equal parts, with plenty of sand. Good drainage is necessary. Lasianthos, 4′, June, purple lilac, is handsome when planted out in a greenhouse. Nivea, 3′, grey; and rotundifolia, 3′, July, purple (*syn.* retusa) are less often met with than the first named.

Privet, Mock (*see Phillyrea*).
Promenæa (*see Zygopetalum*).

PROTEA.

Evergreen shrubs (*ord.* Proteaceæ), with leathery leaves, and requiring cool greenhouse treatment. Propagation is slowly effected by cuttings of the young shoots just matured, and placed firmly in pots of very sandy loam in a cold frame or pit during summer. Stand the pots where they will be shaded from direct sun, and cover with a bell-glass or hand-light. Soil, fibrous loam, with a little peat and sand, rendered more porous by the use of small nodules of charcoal and finely broken pieces of soft red bricks, well mixed together. Night temperature in winter, 40°, rising 5° by day; summer, as cool and airy as possible. A Heath house is a good place for them.

Principal Species and Varieties :—

cordata, 1½′, Ap., pur. (*syn.* cordifolia).
cynaroides, 1½′, Aug., pur.
— elliptica, lvs. elliptic.
grandiflora, 8′, My., wh.
— marginata, 6′, Je., wh.
rhodantha, 4′, Je., red.

PROTECTION.

Fruit Trees on Walls. — Peaches, Nectarines, Apricots, and other valuable fruit trees flower at a time when the blossom is liable to be injured by sharp frosts at night and in the early morning, more especially if it had happened to be raining or snowing the previous night. In these circumstances, it is often necessary to have recourse to some temporary means of protection. Where the coping consists of stone, permanent iron hooks may be let in. Others fix a plank along the top of the wall, into which hooks are driven from which to suspend tiffany or canvas coverings. This canvas may be fixed on thin rollers and made to roll up to the top or drop to the base of the walls by means of cords run through the hook or ring at the top. Rough, stout poles may be stood against the walls in a slanting direction, resting on the ground about 2′ from the wall. These will keep the canvas off the trees, and save damage to the blossom. These sheets of canvas, being in convenient lengths, may be drawn over the trees at night if frost threatens, and pulled to the top or let down to the bottom, according to their arrangement, in the morning after the temperature has risen. Glass copings fixed at the top and extending in a sloping direction about 18″ from the wall make a useful protection, as they save much daily labour. The iron framework should be permanent, but the glass may be movable. Some gardeners use two or three folds of old herring netting instead of canvas; others fix Spruce or Laurel Cherry boughs among the branches of the fruit trees while in blossom. The principal thing is to check radiation, and so conserve the heat which has accumulated in the wall during the day.

Roses.—Dwarf Tea and Hybrid Tea Roses may have their lower buds protected in winter by drawing 3″ or 4″ of soil over them, leaving it there till all danger is past. Standard Roses of the same class may have dried Bracken twisted into the heads during severe frost, but it should be removed immediately mild weather returns.

Palms.—One of the common fan Palms, Trachycarpus excelsa, is hardy in the southern and western counties, but it is convenient to erect a temporary protection, by fixing canvas over a framework of poles, to guard the leaves against damage by wind,

Choice Shrubs whose hardiness is doubtful may be protected by similar coverings on a small scale, but movable, so that they can be taken off during the day.

Bulbs.—Tender bulbs and other deciduous herbs and roots may be protected in winter by a layer of coal ashes or leaf mould not much decayed.

PROUSTIA.

Greenhouse climbers, allied to Mutisia (*ord.* Compositæ). Propagation, by seeds when obtainable; and by cuttings of side shoots getting firm at the base, in sand, placed in heat and covered with a bell-glass. Soil, fibrous loam and one-third peat, with sand and good drainage. Pyrifolia, 10′, white, is the only introduction.

PRUMNOPITYS.

Handsome hardy or greenhouse trees (*ord.* Coniferæ), allied to the Podocarpuses, from which they differ by the absence of the fleshy "receptacle" at the base of the fruit. Spicata is hardy in the south-west of England and Ireland only. Propagation, by cuttings of the young shoots, removed when almost ripe and struck under a bell-glass in a frame or warm house. Soil, good loam.

Principal Species:—

elegans, 40′ to 50′, hdy., lvs. dark grn. above, lighter beneath (*syns.* Podocarpus andina and Stachycarpus andina). Plum Fir.

spicata, 80′, lvs. grn. above, glaucous beneath (*syn.* Podocarpus spicata). Black Pine.

taxifolia, Yew-leaved.

PRUNELLA (*syn.* BRUNELLA).

A small genus of useful and pretty border or rockery herbs (*ord.* Labiatæ), with flowers arranged in whorled spikes. Propagation, by seeds sown in spring or early summer, under glass or in the open air; also by division in spring, or after flowering. Any good loamy soil.

Principal Species and Varieties:—

grandiflora, 6″ to 12″, sum., pur.

— alba, 6″ to 12″, sum., wh.

— rubra, 6″ to 12″, sum., red (*syn.* webbiana).

hyssopifolia, 6″ to 12″, Aug., pur.

vulgaris, 6″ to 12″, Jy., pur. All-heal.

— alba, 6″ to 12″, Jy., wh.

— laciniata, 6″ to 12″, Jy., pur.

— rubra, 6″ to 12″, Jy., red.

PRUNING.

Object of Pruning.—In the early stages of fruit trees to be trained on walls, fences, espaliers, or buildings, pruning is so effected as to secure the requisite number of shoots to lay the foundation of the tree, and in succeeding years to ensure that the lateral shoots will be at regular distances apart. The most favourably situated shoots must be selected, to be tied in to wires or nailed to walls as the case may be, and the rest must be shortened to one or two buds at the base to form spurs. Standard and half-standard trees, and bushes, are pruned in the early stages to get about three, six, and twelve branches respectively in one, two, and three years, with the object of laying the foundation of a well-balanced head or bush. In after years spur pruned trees upon walls are pruned to remove the superfluous wood of each year's growth, to keep the spurs as close to the wall as possible in order to reap the benefit of sun heat in maturing the fruit crop, and also to remove unnecessary spurs to prevent crowding, the object being to allow air and sunlight to play their part in ripening the wood, and to favour the development of the largest sized fruits. To obtain the latter object, the thinning of the fruits must also be practised. After the head or main branches of standards have been secured, pruning will consist in removing dead wood, weak and useless shoots, and those that cross one another, and in so regulating the head that air and light can play freely upon all parts of the tree. Trees that are properly thinned in this way are less subject to fungoid and insect attacks.

Root Pruning.—Fruit trees in their early stages, especially in rich soil, are liable to make growth of so vigorous and gross a nature that they remain unfruitful, and do not mature the wood properly before the fall of the leaf. In the case of young trees, this may be checked by lifting and replanting the trees in autumn. In after years the repeated removal of superfluous wood results in a multiplicity of shoots, like Willow stools, where spurs should be. This is a sure sign that the root system is in excess, and out of proportion to the head it has to support. The roots should be uncovered and shortened back to within 3′ or 5′ of the trunk, according to the size of the tree. The tap root should also be removed, or shortened severely. In the case of very large trees only half the roots should be pruned in any one year, the other half being reserved till the next. Root pruning reduces the vegetative vigour of the trees, and induces fruitfulness, and when once this condition has been attained root pruning ceases to be a necessity in well-regulated trees. (For details of pruning fruit trees, *see* APPLE, and other fruits.)

Photo: Cassell & Company, Limited.

PRUNUS AVIUM (*see p.* 241).

Proteinophallus (*see Amorphophallus*).

PRUNUS.

Description.—A large genus of deciduous and evergreen trees and shrubs (*ord.* Rosaceæ), mostly hardy, and often highly valued for their fruits. They are also prized for the beauty of their flowers, which precede or accompany the leaves, the former being valued for their earliness. Peaches and Almonds are amongst the earliest trees to brighten the garden and grounds in spring.

Propagation.—By seeds for the species and to obtain stocks. Budding and grafting are adopted in the case of fruit trees. Some produce suckers, which may be detached. Layering is also practised to obtain stocks.

Classification.—Botanists have always experienced a difficulty in finding distinctions that would effectually separate the species of Amygdalus, Armeniaca, Cerasus, and Prunus, and as they are closely allied they are now all classed under Prunus. For garden purposes it is convenient to place them in groups, as this gives a ready clue to the character of the trees under consideration. Peaches and Almonds have nearly stalkless flowers, a wrinkled stone, and the leaves folded in bud. Apricots have stalkless or stalked flowers, a smooth stone, furrowed at the edges, and leaves rolled in bud. Plums have stalked flowers, the leaves rolled in bud, and the fruits mostly covered with a glaucous bloom. Cherries have stalked flowers, fruits without bloom, and the leaves folded in bud like the Peach. Bird Cherries have their flowers in racemes. Laurel Cherries differ from Bird Cherries by having evergreen leaves. All those enumerated are hardy.

Photo: Cassell & Company, Ltd.

PRUNUS MAHALEB VAR. PENDULA (*see p.* 241).

Soil.—Ordinary well-drained garden soil for all the hardy species. Fruit trees are highly benefited by lime in the soil, and where this is deficient it should be supplied in the form of dressings.

Other Cultural Points.—For the pruning of trees grown for fruit, *see* PRUNING. As the ornamental species flower on the shoots and spurs of the previous year's growth, all necessary pruning should be deferred till the petals fall. Trees upon walls sometimes require a considerable amount of pruning, as in triloba. If this is accomplished immediately the flowers are over, the tree has time to develop and mature flowering wood for the next year. Triloba does best on walls, but succeeds as a bush in the open; and both this and Peaches, Almonds, and pseudo-cerasus are popular subjects for pot culture and forcing. Trees and bushes in the open ground should also receive the necessary thinning or trimming just after flowering.

ALMONDS AND PEACHES.

Principal Species and Varieties :—

Amygdalus, 20′ to 30′, Mch., Ap., ro. or wh. The Almond.
— flore pleno, double red.
— macrocarpa, pale ro.; the largest.
davidiana, 10′ to 20′, Jan., Feb., Mch, pale ro.
— alba, wh.
nana, 2′ to 3′, Mch., Ap., ro. Dwarf Almond.
Persica, 15′ to 30′, Mch., Ap., ro. (*syn.* Persica vulgaris). The Peach.
— Clara Mayer, double, red; one of the best.
— flore roseo pleno, double ro.
— flore albo pleno, double wh.
— foliis rubris, lvs. pur. Purple-leaved Peach.

— lævis (*syns.* Persica lævis and Amygdalus Persica nectarina). The Nectarine.
— sanguinea plena, double red.

Other Species and Variety :—

Amygdalus amara. Bitter Almond.
— dulcis. Sweet Almond.
incana, 2′ to 3′, Mch., Ap., red.
orientalis, 10′, Ap., red, lvs. silvery.
Simonii, 15′, Mch., Ap., wh. (*syns.* Persica and Amygdalus Simonii).

APRICOTS.

Principal Species and Varieties :—

Armeniaca, 15′ to 30′, Feb., Mch., blush wh. (*syn.* Armeniaca vulgaris). Apricot.
Mume, 2′ to 4′, Mch., Ap., wh. (*syn.* Armeniaca Mume).
— Alphandi, rosy pk., semi-double.
triloba, 3′ to 10′, Ap., silvery ro. (*syns.* Amygdalopsis and Prunopsis Lindleyi).
— flore pleno, double silvery ro. (*see p.* 242).

Other Species :—

Brigantiaca, 6′ to 15′, Mch., Ap., wh. or pk. (*syn.* Armeniaca Brigantiaca).
dasy carpa, 10′ to15′, Ap., wh.
tomentosa, 3′ to 4′, Mch., Ap., wh.

PLUMS.

Principal Species and Varieties :—

cerasifera, 15′ to 30′,Mch., Ap. (*syns.* mirobalana and Cerasus myrobalanos). Myrobalan, or Cherry Plum.
— atropurpurea, lvs. dark pur. (*syn.* Pissardi).
communis, 20′, Mch., Ap., wh. (*syn.* domestica). The Plum.
— flore pleno, double.
divaricata, 10′ to 15′, Ap., wh.
Pissardi (*see* cerasifera atropurpurea).

Other Species and Varieties :—

angustifolia, 8′, Ap., wh. (*syns.* Chicasa and Cerasus Chicasa).
Cocumilio, 2′ to 3′, Ap., wh. Cocomilla Plum.
communis juliana, 15′, Mch., Ap., wh. Used as a stock.
— pruneauliana flore pleno, double wh.
insititia, 10′ to 20′, Ap., wh. Black Bullace.
— fructu albo, fruit wh.
— fructu rubro, fruit red.
spinosa, 6′ to 15′, Mch., Ap., wh.
— flore pleno, double.

CHERRIES.

Principal Species and Varieties :—

acida semperflorens, 10′ to 20′, Ap. to Je., wh. (*syn.* Cerasus semperflorens). Ever-flowering Cherry.
Avium, 30′ to 50′, Ap., My., wh. (*syns.* Cerasus Avium, nigra, and sylvestris). Gean, or Wild Cherry.
— flore pleno, double wh. (*syn.* Avium multiplex).
Cerasus, 15′ to 20′, Ap., wh.(*syns.*acida of Ehrh, Cerasus acida of Mill, and vulgaris). The Common Cherry.
— persicæflora,double ro.; rare.
— Rhexii flore pleno, double wh. (*syn.* Cerasus caproniana multiplex and caproniana ranunculiflora).
japonica, 2′ to 3′, Ap., My., pk. (*syns.* chinensis, sinensis, and Amygdalus pumila). Chinese Cherry.
— flore pleno albo, double wh.
pennsylvanica, 16′ to 30′, My., wh.
pseudo-cerasus, 6′ to 12′, Ap. wh., semi-double ro. (*syns.* paniculata, Cerasus pseudo-cerasus, Sieboldi rubra and Watereri). Bastard Cherry.
— James H. Veitch, dark ro. ; the best.
prostrata, 2′, Ap., red.
Puddum, 15′ to 20′, Ap., wh.
serulata, 4′ to 6′, Ap., wh. to pk. ; a spreading tree.

Other Species and Varieties :—

acida, 20′, Ap., wh. (*syns.* Cerasus acida of Dum and caproniana).
Avium juliana, 20′, Ap., wh. (*syn.* Cerasus juliana).
Chamæcerasus, 8′, My., wh. (*syns.* fruticosa and Cerasus Chamæcerasus).
japonica multiplex, pk., semi-double.
pendula, 10′, Ap., wh.
(*syns.* subhirtella and Cerasus pendula).
pumila, 4′, My., wh. (*syns.* depressa, and Cerasus pumila and depressa).

BIRD CHERRIES.

Principal Species and Varieties :—

Capollin, 5′ to 10′, My., Je., wh. (*syns.* Capuli, and Cerasus Capuli and Capollin). The Capollin.
Mahaleb, 10′ to 30′, Ap., My., wh. (*syns.* odorata and Cerasus Mahaleb). The Mahaleb, or Perfumed Cherry.
— chrysocarpa, fruit yel.
— pendula, drooping (*see p.* 240).
Padus, 12′ to 40′, Ap. to Je., wh. (*syn.* Cerasus Padus). Bird Cherry.
— flore pleno, double.
serotina, 10′ to 20′, My., Je., wh. (*syn.* cartilaginea). American Bird Cherry
virginiana, 20′ to 40′,My., wh. (*syns.* rubra and Cerasus virginiana). Virginian Bird Cherry, or Choke Cherry.

Other Species :—

mollis, 12′ to 25′, Je., wh.
nepalensis, 6′ to 15′, My., wh.
salicifolia, 10′ to 15′, My., wh.

LAUREL CHERRIES.

Principal Species and Varieties : -

Laurocerasus, 6′ to 20′, Ap., My., wh. (*syn.* Cerasus Laurocerasus). Laurel Cherry, or Common Laurel.
— caucasica, lvs. dark grn., hardier.
— colchica, faster growing and hardier ; one of the best.
— latifolia, lvs.very broad.
— schipkaensis, very hdy.
— camelliæfolia. Many other garden vars.
lusitanica, 10′ to 30′, Je., wh. (*syn.* Cerasus lusitanica). Portugal Laurel.
— azorica, lvs. larger, petioles sometimes red.

Other Species and Varieties :—

caroliniana, 20′ to 30′, My., wh. (*syns.* serratifolia, Cerasus caroliniana, and Laurocerasus caroliniana).
ilicifolia, 4′ to 6′, Je., wh.; requires a wall (*syn.* Cerasus ilicifolia).
lusitanica myrtifolia, lvs. much smaller. Many other vars.

PSAMMISIA.

Warm greenhouse shrubs (*ord.* Vacciniaceæ), with evergreen foliage. Propagation, by cuttings in sandy peat, kept moist under a bell-glass, in heat. Soil, peat, one-third fibrous loam and sand.

Principal Species :—

hookeriana, 6′, Sep., red (*syns.* pinchinensis glabra and Thibaudia pinchinensis glabra).
longicolla, 4′′, crim., grn.
sarcantha, spr., red, yel. (*syn.* Thibaudia sarcantha).

PSEUDODRACONTIUM.

Neither of the two species of this genus (*ord.* Aroideæ) possesses any great horticultural value, and neither is commonly grown. Both may be treated in the same way as Caladiums.

Principal Species :—

Lacourii, grh., lvs. large, grn., yel. spotted (*syn.* Amorphophallus Lacourii).

PSEUDOGALTONIA.

Greenhouse bulb (*ord.* Liliaceæ), requiring the same treatment as Galtonias.

Only Species :—

Pechnellii, lvs. about 1′ long, fleshy, flowers grn., wh. (*syn.* Lindneria fibrillosa)

Pseudo-chænomeles Maulei (*see Pyrus Maulei*).
Pseudococcus Ulicis (*see Mealy Bug*).

PSEUDOLARIX. (False or Chinese Larch, and Golden Larch.)

A hardy tree of noble presence (*ord.* Coniferæ). It is separated from the true Larches by the cones having deciduous scales. (For culture, *see* Pinus.)

Only Species :—

Kæmpferi, 120′ to 130′, lvs. 1½″ to 2½″ long, grn. when young, golden when old, cones 3″ long, pendulous (*syns.* Fortunei and Abies, Larix and Pinus Kæmpferi).

PSEUDOPANAX.

Greenhouse evergreen shrubs or small trees (*ord.* Araliaceæ), thriving when treated like the Aralias.

Principal Species :—

crassifolium, 40′, grn., wh. (*syns.* Aralia crassifolia, and Panax crassifolium). There are vars. punctata and trifolia.
Lessonii, lvs. thick, leathery.

PSEUDOPHŒNIX.

Sargentii, 25′, stove, leaves 4½′ long, pinnate, fruits bright orange or red, ¾″ across, the only species (*ord.* Palmæ), may be cultivated like the Phœnixes (which *see*).

PSEUDOTSUGA.

One species (*ord.* Coniferæ), with many varieties, several of which, especially brevifolia pendula and Stairii, are handsome trees, and, like the type, hardy in all but very exposed positions. Douglasii likes a rather sheltered position, and should not be planted near the coast. When at its best it is one of the noblest of Conifers, and apart from the points already mentioned, not difficult to grow. (Culture and propagation as for Pinus, which *see*.)

Photo: Cassell & Company, Ltd.

Prunus triloba flore pleno (*see p.* 241).

Only Species and its Varieties :—

davidiana (*see* Keteleeria davidiana).
Douglasii, 100′ to 180′, lvs. silvery beneath, cones 4″ long, ovate oblong (*syns.* taxifolia, Abies Douglasii, mucronata, and taxifolia, Picea Douglasii, Pinus Douglasii and taxifolia, and Tsuga Douglasii).
— brevifolia, lvs. shining grn., pyramidal habit, growth slow.
— glauca, lvs. dark grn.

— pendula, 50′, pendulous branches.
— pumila, dwarf and compact.
— Staurii, lvs. nearly wh. in spr., not so strong a grower as the type.
— Standishii, lvs. larger than the type, silvery beneath.
— taxifolia, lvs. long and branches stout, dwarfer than the type.
magnifica (*see* Abies magnifica).
nobilis (*see* Abies nobilis).

PSIDIUM. (Guava.)

A large genus (*ord.* Myrtaceæ) of stove trees, shrubs, and sub-shrubs. Few of them are of any garden value, and the genus is best known because of the economic value of Guava, the delicious Guava of the tropics. Cattleianum has been fruited under glass in Britain with considerable success. Propagation, by cuttings of the young shoots beginning to get firm at the base, inserted in sand, under a bell-glass, with bottom heat. Soil, fibrous loam three-parts, leaf mould one part, and cow manure one part, with one-eighth sand. Drainage must be free, for the plants need a good deal of water, and do not like to be frequently disturbed. Large wooden tubs will be required for fruiting plants, or they may be planted out in a prepared border, and the growths trained to a wall or trellis.

Principal Species and Varieties :—

cattleianum, 10′ to 20′, My., wh., fruits claret colour, reddish pulp, as large as a small Fig. There is a var. littorale.
Guava, 6′ to 15′, Je., wh., fruits yel., globose, astringent (*syn.* Guava).
— aromaticum, 5′ to 8′, Jy., wh., fruits yel.
— pomiferum. Red Guava.
— pyriferum, Je., wh., Pear shaped. Common Guava.

Other Species and Varieties :—

aromaticum (*see* Guava var.).
cordatum (*see* montanum).
montanum, 5′, My., Jy., wh. (*syn.* cordatum). Mountain Guava.
passeanum, 3′ to 6′, wh., fruits grn. or yel., Pear shaped.
polycarpon, 3′, My., wh.
pyriferum (*see* Guava var.).

PSILOTUM.

Club-mosses (*ord.* Lycopodiaceæ) of no great horticultural value, although they are interesting. Propagation, by cuttings. Triquetrum likes a well-drained pan of fibrous peat; it will grow on stems of dead Tree Ferns.

Principal Species :

triquetrum, 9″, st., lvs. very small or wanting, stems forked. Mascarenica and nudum are vars.

PSORALEA.

A large genus (*ord.* Leguminosæ) of hardy or greenhouse, annual, biennial, or perennial herbs and shrubs. Propagation, by cuttings of the half-ripened shoots, in April and May, in sand, under a bell-glass, for the shrubs; by root division before growth commences, for the herbaceous species. Soil, light, rich loam for the hardy species, peat for the pot plants. Although upwards of 100 species have been described, comparatively few of them are in cultivation.

Principal Species and Variety :—

aculeata, 2′ to 3′, Jy., grh. shr., bl., wh.
pinnata, 3′ to 6′, My., Jy., grh. shr., bl.
— arborea, 6′ to 8′, My., grh. shr., bl. (*syn.* arborea).

Other Species :

aphylla, 4′ to 7′, sum., grh. shr., bl., wh., lvs. simple.
glandulosa, 4′, sum., hlf-hdy. shr., wh., bl.
melilotoides, 1′ to 2′, Aug., hdy. per., pale pur.

PSYCHOTRIA (*syns.* Myrstiphyllum and Psychotrophum).

Stove shrubs, and erect and climbing herbs (*ord.* Rubiaceæ). A few make good garden plants. Propagation, by cuttings in spring, in sandy peat, with brisk bottom heat. Soil, equal parts of loam and peat, with one-sixth sand, and a few pieces of charcoal. Free drainage.

Principal Species :—

cyanococca, bl., berries bl., ripening in win., a pretty herb, very useful for win. decoration (*syn.* cyanocarpa).
jasminiflora, shr., wh. (*syn.* Gloneria jasminiflora).
sulphurea, cl., bl., fruits yel.

Other Species :—

leucocephala (*see* Rudgea macrophylla).
pilosa, herb, wh., fruits bl. (*syn.* chontalensis).
racemosa, 2′ to 3′, Je., shr., wh., small.
tabacifolia, Sep., shr., yel.

PSYLLA.

A considerable number of species is included in this genus of small insects (*ord.* Homoptera), and they all bear a general resemblance to Aphides. They are social in habits, and occasionally are covered and protected by a cotton-like excretion. They live by sucking the sap from the young branches and leaves of plants, and sometimes these wounds develop into galls. They differ from Aphides by their greater size; shorter, thicker thighs, which enable them to make enormous leaps; harder bodies, and round wings. They do not increase asexually. The two species which most concern gardeners are pyrisuga, which does considerable damage to Pears, and Mali, the Apple Sucker.

Although it is not difficult to kill the insects, it is difficult to destroy the eggs without hurting the trees. (*See* Insecticides.) The persistent removal of dead wood and snags should not be forgotten.

PTELEA.

Hardy trees (*ord.* Rutaceæ). Propagation, by seeds and layers. Garden soil.

Principal Species and Variety :—

trifoliata, 4′ to 8′, sum., grn., yel. Hop Tree, Swamp Dogwood.
— aurea, foliage golden when young, a pretty shrubbery plant.

PTELIDIUM.

A handsome stove shrub (*ord.* Celastrineæ). Propagation, by cuttings of ripe shoots, in sand. Soil, loam and peat, with sand.

Only Species :—

ovatum, 3′, flowers grn., lvs. very small.

PTERIDOPHYLLUM.

Herbaceous plants (*ord.* Papaveraceæ), with thick rhizomes. Allied to Hypecoum. Probably not in cultivation.

PTERIS.

Description.—This genus of Ferns (*ord.* Filices) contains many useful and handsome garden plants. Tremula, cretica, and serrulata, with their numerous varieties, are grown by the thousand for market purposes. The genus is remarkable for its wide range—hardy, greenhouse, and stove species are included, and the length of the fronds varies from

Psila (*see Carrot Maggots*).
Ptarmica (*see Achillea*).

a few inches to several feet, while as to cutting, all stages are shown, from the undivided up to the three or four times pinnate. One remarkable feature is the number of variegated Ferns among the Pterises—argyræa, Victoriæ, Alexandræ, and Mayi, shorn of their specific names, are familiar examples. In some cases, as in quadriaurita and its varieties, the young fronds take on a bright rose or claret hue, at once striking and effective. Now included under Pteris are Amphiblestra, Campteria, Doryopteris, Heterophlebium, Litobrochia, Pæsia, and Pycnodoria.

The genus Pteris is also noteworthy for its economic value, although these qualities are practically all centred in aquilina. In many parts of the country Bracken is cut in autumn, dried, and stored in stacks for covering material.

Pteris cretica.

The ashes are a valuable dressing, and, being rich in potash, have been employed in glass manufacture.

Propagation.—In most cases by spores; palmata produces bulbils, which speedily make strong young plants if the fronds are pegged down to the soil. Species with creeping rhizomes, by division. The variety smithiana, although it produces spore cases, has no spores.

Soil.—Equal parts of peat or leaf mould and loam, with sand. Weak-growing varieties need a little more peat. (*See* Ferns.)

Principal Species and Varieties :—

[Note.—The dimensions refer to the fronds, and do not include the length of the stipe or stalk.]

aquilina, fronds 8″ to 48″ long, 6″ to 24″ broad, finely cut, lowest pinnæ bipinnate, light grn., thin but leathery, hdy.; many vars. Bracken, Brake Fern, Eagle Fern.
— cristata, hdy., tips of the pinnæ crested. Found at Tunbridge Wells; cresting fairly constant.
— esculenta, grh., pinnules narrow, rhizome is eaten by the aborigines. Edible Fern of Tasmania.
arguta, 1′ to 3′ long, 1′ to 1½′ broad, pinnate, lowest pinnules pinnatifid, warm grh., st., soft, papery.
aspericaulis, 1½′ long, st., pinnate, lowest pinnæ bipartite, claret hued when young.
— rubro-nervia, st., red veins and midrib.
— tricolor, 2′ long, st., pur. red or bright ro. when young, dark grn., grey, with pur. veins when mature (*syn.* quadriaurita tricolor).
biaurita, 8″ to 18″ long, 6″ to 8″ wide, st., not so deeply cut as quadriaurita.
— argentea, st., deep grn., silvery wh., more useful than type.
cretica, barren fronds 6″ to 12″ long, 4″ to 8″ broad, pinnate, fertile fronds longer, more erect, and with much narrower pinnæ, grh. or intermediate, pale grn., leathery (*see* figure); many vars., including:
— albo-lineata, st. or grh., pinnules broad, and with a central silver band; most useful; comes true from spores.
— albo-lineata Alexandræ, like albo-lineata, but with crested fronds, very handsome (*see p.* 248).
— crispata, st. or grh., fronds crisped, with central grey band.
— major (*see* serrulata Ouvrardii).
— Mayi, grh., like albo-lineata, but crested and smaller; plant smaller; comes true from spores.
— nobilis, erect habit, fronds crested, pale grn.; makes a bushy grh. plant; comes true from spores (*see p.* 245).
— Ouvrardii (*see* serrulata var.).
— sempervirens, crested, stands well in dwelling rooms.
— Summersii, much divided and crested, elegant.
— Wimsettii, 1½′ to 2′ long, grh., tips of pinnules forked, crested. Grand market Fern.
Drinkwateri, 15″ to 18″ long, ¾″ wide, dark grn., vigorous.
ensiformis, 6″ to 12″ long, 3″ to 6″ broad, grh., fertile fronds narrower and more cut, leathery (*syn.* crenata).
— Victoriæ, barren fronds small and prostrate, fertile ones 1′ to 1½′ long, with narrow pinnæ, prettily variegated (*syn.* e. variegata of Moore). Several sub-vars. even prettier. Reginæ is of more vigorous growth, and the variegation is in narrower stripes; cristata has crested fronds.
flabellata, 1′ to 3′ long, 1′ to 1½′ broad, warm grh., st.; like arguta.
— ascensionis, smaller.
heterophylla, 6″ to 12″ long, 3″ to 6″ broad, triangular, tripinnate, st., thin, papery. Internata is a var.
leptophylla, 9″ to 12″, each way, deltoid, much cut, with long narrow pinnules, st., soft, papery, greyish grn.
longifolia, 1′ to 2′ long, 6″ to 9″ broad, pinnate, leathery, grh.; market Fern (*see p.* 245).
— Mariesii, shorter fronds, narrower pinnæ, st.; comes true from spores.
— nobilis, 4′ to 5′ long, st.
ludens, barren fronds entire, triangular to halberd shaped, with two well-marked lobes, very leathery, fertile ones 4″ to 6″ each way, deeply lobed, and roughly palmate, st. (*syn.* Doryopteris ludens).
nobilis, st., first fronds heart-shaped, next series halbert-shaped, final series palmate, thick, leathery, bright grn., banded wh. (*syns.* elegans, Litobrochia grandis, and nobilis of J. Smith; that of gardens is a form or *syn.* of palmata).
— Duvalii, fronds very stout.
— variegata, variegation strong.
palmata, 4″ to 9″ each way, st., dark grn., barren fronds five-lobed, terminal one largest, fertile fronds deeply cut, palmate, narrow lobes, leathery (*see p.* 246). Collina and variegata are vars.
patens, 3′ to 4′ long, 2′ to 3′ broad, bipinnatifid, leathery, st. (*syn.* decussata).
pedata, st., close to palmata, but more divided.

PTERIS CRETICA NOBILIS (*see p.* 244).

quadriaurita, 6″ to 36″ long, 4″ to 12″ broad, bipinnate, lower pinnæ forked, st.
— argyræa, fronds with central wh. band.
— rubricaulis, stipes red, fronds bright claret when young, difficult to grow.
sagittifolia, 4″ to 6″ long, 2″ to 3″ broad, arrowhead shaped, leathery, st., deep grn. (*syn.* Doryopteris sagittifolia).
scaberula, 1′ to 1½′ long, 6″ to 9″ broad, tripinnate or quadripinnate, leathery, grh., pale grn.
serrulata, 9″ to 18″ long, 6″ to 9″ broad, bipinnatifid, warm grh. or intermediate, pale grn., leathery. Some vars. approach closely to cretica. Spider Fern.
— angustata, pinnæ and pinnules narrower, tips tasselled.
— applebyana, pinnules long, tips tasselled.
— cristata, crested fronds (*see p.* 246). Densa compacta and major are sub-vars.
— gracilis, pinnæ very narrow. Multiceps is a sub-var. with crested tips; habit drooping.
— Leyi, pinnules reduced to midribs.
— Ouvrardii, 1′ to 1½′ long, upright, intermediate between serrulata and umbrosa (*syn.* cretica major of gardens).
— plumosa, heavily tasselled.
— polydactyla. tips of pinnules much forked.
— tenuifolia, fronds like gracilis, but erect.
tremula, 2′ to 4′ long, 6″ to 24″ broad, finely cut, soft, papery, grh., bright grn.; a good window Fern. Australian Bracken.
— elegans, smaller than species, apices of fronds forked.
— flaccida, grn.; pinnules narrow.
— foliosa, broader, pale grn.
— grandiceps, tasselled.
— nivalis, fronds wh., grn., rare.
— smithiana, plants 2′ to 2½′, heavily tasselled, stiff, erect, grh.
— variegata, grn., wh., central band.
umbrosa, 1′ to 2′ long, 6″ to 12″ broad, bipinnatisect, leathery, drooping, grh.
— cristata, a crested var.

Other Species and Varieties :—

albo-lineata (*see* cretica var.).
argyræa (*see* quadriaurita var.).
collina (*see* palmata var.).
comans, 2′ to 3′ long, 1′ to 1½′ broad, bipinnate, soft, papery, st.
— densa, more spreading fronds.
crassipes (*see* gigantea).
crenata (*see* ensiformis).
crispa of gardens (*see* straminea).
Currori, 3′ to 4′ long, 2′ broad, pinnæ deeply cut, soft, papery, st.
decussata (*see* patens).
deflexa, 2′ to 4′ long, pinnæ 1′ long, deeply cut, leathery, st.
denticulata, 12″ to 24″ long, 8″ to 12″ broad, bipinnatifid, leathery, st. (*syn.* Litobrochia denticulata).
elata, fronds several feet long, leathery, st. (*syn.* Litobrochia elata).
esculenta (*see* aquilina var.).
geraniifolia of gardens (*see* Pellæa geraniifolia).
Ghiesbreghtii (*see* laciniata var.)
gigantea, 2′ to 3′ long, tripartite, stipes 2′ to 3′ high, st., fronds much cut, leathery (*syns.* crassipes and Litobrochia gigantea).
glauca (*see* Pellæa glauca).
gracilis (*see* Pellæa gracilis).
grandifolia, 1′ to 2′ long, pinnate, leathery, st. (*syn.* Litobrochia grandifolia).
hastata (*see* Pellæa hastata).
hookeriana, 9″ to 12″ long, 6″ to 9″ broad, pinnate, lowest pinnæ forked, leathery, st.
incisa, fronds several feet long, bipinnate or tripinnate, glaucous, grh., a strong grower (*syn.* Litobrochia vespertilionis).
— aurita, bottom pinnæ entire.
intramarginalis of gardens (now Pellæa intramarginalis).
laciniata, 1′ to 2′ long, deltoid, tripinnatifid, soft, papery, hairy, st. (*syn.* Lonchitis hirsuta of gardens).
— Ghiesbreghtii, less hairy (*syn.* Lonchitis Ghiesbreghtii of Linden).
milneana, 2′ to 3′ long, st.; resembles quadriaurita, but soft and papery.
moluccana, 2′ to 3′ long, pendulous, pinnate, leathery, st., bright grn.; a strong grower.
mutilata, 6″ each way, deltoid, bipinnatifid, st., segments of fertile fronds very narrow.
— concinna, more deeply cut.
nemoralis of gardens (*see* biaurita).
paleacea, 1′ to 1½′ each way, pinnate, lowest pinnules lobed, st.
podophylla, 4′, tripinnate, very thick, st., strong grower (*syn.* Litobrochia podophylla).
pungens, close to quadriaurita, prickly stalks.
semipinnata, 12″ to 18″ long, 6″ to 9″ broad, pinnate, lower pinnæ pinnatisect on one side, grh.
— Bausei, 1′ long, tufted, bipinnate and pinnate, warm grh.

PTERIS LONGIFOLIA (*see p.* 244).

straminea, 1′ to 1½′ long, grh. (*syn.* crispa of gardens).
tricolor (*see* aspericaulis var.).
tripartita (*see* milneana).
undulata, 2′ long, 2′ broad, triangular, pinnate, pinnæ lobed, st. (*syn.* areolata).
vespertilionis (*see* incisa).
Victoriæ (*see* ensiformis var.).
wallichiana, large, tripinnate, central pinna 2′ long, 1′ broad, grh. (*syn.* Campteria wallichiana).
Wimsettii (*see* cretica var.).

PTERISANTHES.

Stove climbers (*ord.* Ampellideæ). Polita is probably the only species that has as yet been introduced, and it is still rare and of little garden value. Culture as for CISSUS DISCOLOR, which *see*.

PTEROCARPUS.

Stove trees (*ord.* Leguminosæ). They are not commonly cultivated. Propagation, by cuttings of firm shoots, in March. Soil, fibrous loam and peat, with sand.

Principal Species :—

Draco, 30′, My., yel. Dragon Gum Tree.
indicus, 30′, My., yel. (*syn.* dalbergioides);
flavus is a var. Burmese Dogwood.
Marsupium, 40′, Ap., yel.
Rohrii, 20′, Ap., yel.

PTEROCARYA.

Hardy deciduous trees (*ord.* Juglandeæ). The leaves are large and ornamental, and the trees make handsome lawn specimens. Propagation, by seeds. Soil, deep medium loam.

Principal Species :—

caucasica, 20′ to 40′, My., grn. (*syns.* dumosa of Lavall, fraxinifolia, pterocarpa, and Juglans fraxinifolia).

PTERIS PALMATA (*see p.* 244).

Other Species :—

rhoifolia, lvs. with eight or nine pairs of leaflets (*syns.* japonica of gardens and sorbifolia).
stenoptera, lvs. with five pairs of leaflets (*syns.* chinensis, lævigata, and sinensis, of gardens).

Pterocephalus (*see Scabiosa*).
Pterochilus (*see Microstylis*).
Pterococcus (*see Calligonum*).

PTERODISCUS.

Greenhouse succulents (*ord.* Pedalineæ), usually with tuberous roots. Propagation, by seeds, sown in autumn and spring, in heat; also by root division. Soil, sandy loam and leaf mould. Full exposure to sunlight is required.

Principal Species :—

luridus, 1½′, Jy., dull yel.
speciosus, 2′, My., lil. or red.

PTERIS SERRULATA CRISTATA (*see p.* 245).

PTEROLOBIUM (*syn.* QUARTINIA and REICHARDIA).

Tall, climbing stove shrubs (*ord.* Leguminosæ), with recurving prickles. Propagation, by cuttings in sand in heat; they are, however, not easy to root. Soil, loam two parts, leaf mould one part, sand one-eighth.

Principal Species :—

indicum, yel., wh. (*syn.* Cæsalpinia lacerans).

PTERONIA.

An obscure genus (*ord.* Compositæ) whose members are of no garden value.

PTEROSPERMUM.

Stove trees and shrubs (*ord.* Sterculiaceæ). Propagation, by cuttings of the semi-matured side shoots, in sand. Soil, fibrous loam and peat, with sand.

Principal Species :—

acerifolium, sum., grh., wh., lvs. clothed with wh. hairs below.
suberifolium, wh. (*syn.* Pentapetes suberifolia).

Pteroloma (*see Desmodium*).
Pteroneurum (*see Cardamine*).
Pteropsis (*see Tænitis*).
Pterostelma (*see Hoya*).
Pterostigma (*see Adenosma*).

PTEROSTYLIS (*syn.* DIPLODIUM).

Tufted, greenhouse, terrestrial Orchids (*ord.* Orchidaceæ), with small, tuberous roots. Propagation, by division, just before growth starts. Soil, leaf mould and sand.

Principal Species :—

acuminata, 6″, Ap., grn.
Banksii, 6″ to 18″, Ap., grn.
Baptistii, 1′, win., grn., wh., br.: the best.
curta, 6″, Oct., grn.
nutans, 6″ to 12″, Sep., grn.

PTYCHOCOCCUS.

Stove Palms (*ord.* Palmæ). For culture, *see* PTYCHOSPERMA and PALMS.

Principal Species :—

arecinus, 60′, lvs. graceful; the best.
paradoxus, 15′ to 20′, stem slender, pinnæ 10″ to 12″ long (*syn.* Ptychosperma paradoxa of Scheff).

PTYCHORAPHIS.

Stove Palms (*ord.* Palmæ). Propagation, by imported seeds. Soil, loam, leaf mould, and sand. Free drainage and plenty of water are needed.

Principal Species :—

augusta, 80 to 100′, lvs. 8′ to 12′ long; resembles Cocos weddeliana when young.
singaporensis, 6′ to 12′, stem slender, lvs. 3′ to 6′ long (*syns.* Drymophlœus, Ptychosperma, and Rhopaloblaste singaporensis).

PTYCHOSPERMA. (AUSTRALIAN FEATHER PALM.)

Elegant stove Palms (*ord.* Palmæ), usually with tall, slender trunks carrying heads of large leaves. All are of easy culture, provided they are given plenty of heat and moisture. Propagation, by imported seeds. Soil, loam three parts, leaf mould one part, and sand. Thrips and red spider are the chief insect enemies, but they rarely do much damage if the syringe is regularly used.

Principal Species :

elegans, lvs. several feet long, jagged at the ends (*syn.* Seaforthia elegans of R. Brown, not of Hooker).
Macarthuri, lvs. 4′ to 8′ long, arching (*syn.* Kentia Macarthuri).
sanderiana, 10′ to 15′, lvs. 4′ long, fruits bright red.
Warletii, lvs. jagged at the ends, silvery beneath; this is only known in a young state.

Other Species :—

Alexandræ (now Archontophœnix Alexandræ).
angustifolia (now Coleospadix oninensis).
disticha (now Pinanga disticha).
filifera (now Vitiphœnix filifera).
Normanbyi (now Areca Normanbyi).
paradoxa (*see* Ptychococcus paradoxus).
perbrevis (now Balaka perbrevis).
rupicola (now Loxococcus rupicola).
Seemannii (now Balaka Seemannii).
singaporensis (*see* Ptychoraphis singaporensis).

PUCCINIA. (RUSTS.)

Parasitic Fungi (*ord.* Fungi), highly destructive of wild and cultivated plants. They are variable in their manner of life, and some pass through a highly complex life cycle. Graminis is an example. Yellow or brown patches make their appearance upon the leaves of the Wheat plants in June, and these are found to be composed of clusters of yellowish spores (uredospores) borne upon branches (basidia) of the mycelium (vegetative portion of the fungus), permeating the tissues of the leaf. The uredospores are one-celled, and germinate in a few hours if placed upon a moist leaf surface. This summer stage was at one time regarded as a distinct organism, and was given the name of Uredo linearis. Several crops of uredospores are produced in the summer, but towards autumn they are succeeded by the two-celled resting spores (teleutospores), which are black in colour. This was the stage formerly considered to be Puccinia Graminis. The uredospores lie dormant until the following spring. In germinating they develop short, thread-like tubes (promycelium), which divide into cells and produce lateral tubes, each of which terminates in a spore (sporidium). These sporidia are produced in great numbers in spring, but before the fungus can again attack the Wheat it has to pass through the Æcidium stage, in which its host plant is the Barberry (Æcidium Berberidis). It produces the "cluster cups" upon the Barberry. The spores from Æcidium Berberidis germinate upon the Wheat, and give rise anew to the rust. The fungus is heterœcious, *i.e.* requires more than one host plant to support it.

Principal Heterœcious Puccinias :—

[NOTE. — u. = uredospores, t. = teleutospores, a. = æcidiospores.]

Caricis, u. (U. Caricis) and t. (P. striola) on Carex, a. (Æ. Urticæ) on Nettles.
coronata, u. and t. on Grasses, a. (Æ. Rhamni) on Rhamnus.
Poarum, u. and t. on Poas, a. (Æ. Tussilaginis) on Coltsfoot.
rubigo-vera, u. (U. rubigo-vera) and t. (P. Straminis) on Grasses, a. (Æ. Asperifolii and Lycopsidis) on members of Borragineæ).
sylvatica, u. and t. on Carex, a. on Dandelion.

Many Puccinias have a simple life cycle. They usually have uredospores and teleutospores, but, as far as can be discovered, only need a single host plant, so that they are said to be autœcious. It is in this section that the most generally destructive species, as far as the gardener is concerned, are to be found. Subjoined is a list :—

Arenariæ, u. not known; forms br. blotches on many species of Caryophyllaceæ, including Pinks and Carnations. Carnation Rust.
Buxi, attacks Box; dark, warty spots; u. not known; not very dangerous.
Gentianæ, attacks Gentiana acaulis; not common; a. not known.
Grossulariæ, t. (Puccinia stage). Gooseberry Cluster Cups.
Hieracii, found upon many Composite weeds; br. blotches. Provisional name for Chrysanthemum Rust, which has also been called Uredo Centaureæ.
Malvacearum, one of the most destructive species. Hollyhock Fungus.
Menthæ, on Mints and various species of Labiatæ; causes gouty shoots; the æcidium stage directly destructive.
mixta, upon Chives and Onions. Has three kinds of spores developed at once, viz. u. and two forms of t., *i.e.* one-celled and two-celled.
pringsheimiana, attacks Gooseberries.

Remedies.—As the growth of the parasites is in the tissues of the host plants, preventive rather than curative measures have to be adopted. Spraying with Bordeaux Mixture and a solution of

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Pterostyrax (*see Halesia*).
Ptilomeris (*see Actiniopteris*).
Ptilostephium (*see Tridax*).
Ptilotrichum (*see Alyssum*).
Ptychochilus (*see Tropidia*).

potassium sulphide is helpful. When Hollyhocks and Onions are badly attacked, the sacrifice of the crop and its destruction by fire may be the only methods open. In the case of heterœcious species it is requisite to break the life cycle by removing one of the known host plants. (For further particulars, *see* CHRYSANTHEMUM, CARNATION, and HOLLYHOCK.)

PUDDLING.

In making ponds and lakes watertight, tough, yellow clay is rammed in with heavy wooden rammers, and the operation is commonly known as puddling. When water sluices are inserted it is necessary to "puddle" for at least 3′ out, to prevent leakage.

Sometimes the term "puddling" is applied to the dipping of Cabbage plants and other Brassicas into a puddle of lime, soot, and earth, mixed up into a thin paste with water. This is a capital plan in cases of drought and where attacks of gall weevil and club are feared.

PUERARIA (*syn.* NEUSTANTHUS).

Greenhouse, climbing herbs (*ord.* Leguminosæ). Propagation, by seeds and by cuttings of the side shoots, in sand, in a close frame with bottom heat Soil, loam and peat, with sand. The plants are rare in cultivation.

Principal Species :—

thunbergiana, sum., hlf.-hdy. cl. A starch from the roots and a fibre from the stems are obtained by the Japanese. (*syns.* Pachyrhizus thunbergianus, and Dolichos hirsutus and D. japonicus).

tuberosa, 3′, Je., bl., leaflets 6″ to 12″ long (*syn.* Hedysarum tuberosum).

Wallichii, 3′, Je., red, bl.

Photo: Cassell & Company, Ltd.

PTERIS CRETICA ALBO-LINEATA ALEXANDRÆ (*see p.* 244).

PULICARIA.

The only species of note (*ord.* Compositæ) is a common British wilding, dysenterica, Fleabane, 6″ to 12″, summer, perennial, yellow (*syn.* Inula dysenterica). Any moist soil.

PULMONARIA. (LUNGWORT.)

Hardy perennial herbs (*ord.* Borragineæ), all more or less hairy, with the leaves spotted with white. Propagation, by division in spring. Ordinary garden soil.

Principal Species and Varieties :—

angustifolia, 1′, spr., pk., bl., lvs. narrow. Azurea is a var. Blue Cowslip.

arvernense, bl., garden origin.

— alba, wh.

Puccoon, Red (see Sanguinaria).

Pukateria (see Griselinia).

mollis, 9″, Ap., My., bl.
officinalis, 1′, spr., red, vio. Sage of Bethlehem.
— alba, wh.
saccharata, 1′, Je., pk.

PULTENÆA.

A rather large genus (*ord.* Leguminosæ) of greenhouse evergreen shrubs. The plants are very beautiful, and not difficult to grow. Propagation, by cuttings of young shoots approaching ripeness, in very sandy peat, beneath a bell-glass, in gentle heat and shaded. Soil, fibrous peat and one-sixth sharp sand, with a few nodules of charcoal. Firm potting and free drainage are essential. They must never be allowed to get dry.

Principal Species :—

obcordata, Ap., yel. (*syn.* Euchilus obcordatus of *Botanical Register* 403).
rosea, 2′, Ap., pk., in round heads.
stricta, 1′ to 3′, Ap., Jy., yel.
villosa, 1′ to 3′, Ap., yel. (*syn.* polygalifolia).

Other Species and Varieties :—

daphnoides, 2′ to 3′, Je., Jy., yel.
— obcordata, lvs. shorter, broader.
dentata, 2′, Je., yel., lvs. silvery beneath (*syn.* argentea).
euchila, 1′, My., yel. (*syn.* Spadostyles Sieberi).
flexilis, 1½′, My., yel., solitary.
juniperina, 1½′, Je., yel., flowers two or three together, plant prickly.
— latifolia, lvs. broader, sharply pointed (*syn.* cordata).
linophylla, 1′, Ap., yel. (*syn.* retusa).
mucronata (*see* polifolia).
paleacea, 1½′, My., yel.
pedunculata, My., yel., prostrate.
polifolia, 2′, My., yel. (*syns.* mucronata and rosmarinifolia).
polygalifolia (*see* villosa).
rosmarinifolia (*see* polifolia).
scabra, 1½′, Ap., deep yel.
— biloba, lvs. two lobed (*syn.* biloba of *Botanical Magazine* 2091).
stipularis, 2′, Ap., yel., in dense heads.
subumbellata, 1′, Ap., yel., striped crim.
tenuifolia, 1½′, Ap., yel., lvs. nearly round.

PULVINARIA.

A genus of Scale insects, distinguishable by the pad of wax secreted by the female beneath the body. Ribesiæ, the Currant Scale; Vitis, which attacks Vines; and floccosa, which is to be found upon Camellias, are the most troublesome. Washing with kerosene emulsion (*see* INSECTICIDES), tobacco water, and nicotine soap is effective. (*See also* INSECTS, and SCALE.)

PUNICA. (POMEGRANATE, PUNIC or CARTHAGINIAN APPLE.)

Description.—The only species of note in this genus (*ord.* Lythrarieæ) is a handsome, deciduous, hardy tree of considerable economic value, since it supplies the Pomegranates of commerce. It has been widely cultivated in many of the warmer parts of the globe from times of great antiquity. Outdoors in this country its fruit seldom forms, and thus, although the tree is hardy enough, it should be given the shelter of a south wall if it is desired that the flowers should be produced. It is only grown for the beauty of its blooms.

Propagation.—By cuttings, suckers, layers, and grafting upon the common species. The last method is usually adopted for the named varieties, of which there are several.

Soil.—It likes a good, loamy soil, although if the soil be heavy, a fourth part of leaf mould and about a tenth part of the whole of road scrapings will be an excellent addition.

Other Cultural Points. — For conservatory decoration, large wooden tubs are the most convenient receptacles. Potting need only be done once in five or six years for large specimens, provided an annual top-dressing be given.

Principal Species and its Varieties :—

Granatum, 15′ to 30′, Je., Sep., hdy., red, in bunches containing two to five fruits as big as a large Orange. Common Pomegranate.
— flore pleno, wh., with yel. calyx, double.
— nana, 5′ to 6′, fruits as large as a Nutmeg; a charming pot plant.

PUPA.

Imago or perfect insect, egg, maggot, chrysalis or pupa. These are the stages in the life cycle of insects, and the pupa is thus the last one before the perfect fly. When, in the words of the entomologist, the metamorphosis of the insect is incomplete, the pupa resembles the perfect insect to a considerable extent, although the wings are always rudimentary. In this section, too, the larva and the pupa resemble each other, and the pupa is as voracious as the larva, although it is larger in size. Examples are to be found in the aphides, crickets, and grasshoppers. When the metamorphosis is complete the pupa is quite helpless, and totally unlike the insect which is to be developed from it. It is, in fact, the quiescent stage, and in most cases, although not in all, it is protected by a cocoon, whose making was the last act of the larva before it became a pupa. Examples are to be found in the Coleoptera, Hymenoptera, and Lepidoptera. Between these two extremes there are many connecting links; thus the pupa of a wasp has its limbs slightly movable, though bound down to its body, and it cannot eat any food.

Frequently the winter is passed under ground, and it is in such cases that the gardener may carry the war into the enemies' country by digging during late autumn to expose the pupæ of injurious insects to the keen eyes of predatory birds. (For further particulars, *see* INSECTS.)

PUPALIA.

Branching stove herbs and sub-shrubs (*ord.* Amarantaceæ). Probably only atropurpurea, of the species included, has been introduced. It is an evergreen shrubby plant, propagated by cuttings, in sand, in a close frame, with bottom heat, and liking a sandy loam.

Principal Species :—

atropurpurea, 1½′ to 2′, Sep., dark pur., branches purplish.

PURSHIA (*syns.* KUNZIA and TIGAREA).

A small genus—two species only—of dwarf hardy shrubs (*ord.* Rosaceæ). Propagation, by cuttings of the young shoots in sand, in a close but not heated frame, in early summer. Soil, loam two parts, leaf mould one part, and sand. (For Purshia of Sprengel, *see* ONOSMODIUM.)

Punnet (*see Measures*).
Purification Flower (*see Galanthus nivalis*).
Purple Flowering Raspberry (*see Rubus odoratus*).
Purple Loosestrife (*see Lythrum Salicaria*).
Purple Medick (*see Medicago sativa*).
Purple Osier (*see Salix purpurea*).
Purple Wreath (*see Petræa volubilis*).

Only Species :—

glandulosa, hdy., yel., wh., Cinnamon scented; close to tridentata.

tridentata, 2′ to 3′, Jy., hdy., yel.

PURSLANE.

The Purslane (Portulaca oleracea) is a small herb with fleshy shoots and leaves, sometimes used upon the Continent as a salading, the older shoots being employed as a potherb and also for pickling. In this country Purslane is rarely grown, and its use is practically unknown, save in a few country places. It is a half-hardy annual, and may be raised from seed sown in gentle heat under glass, the seedlings being planted out at the end of May in a warm corner of the garden, in much the same way as Basil. (For other species, see PORTULACA.)

PUSCHKINIA.

Two species of hardy or half-hardy bulbs (*ord.* Liliaceæ), of which only scilloides (*syn.* libanotica) is in cultivation. It is, however, a general favourite, for it is not difficult to grow, and it flowers freely and well each year. Propagation, by offsets. The clumps of bulbs should be lifted, divided, and replanted about every three years. Annual lifting is not necessary, and it is not desirable where effective clumps are wished for. Soil, sandy loam three parts and leaf mould one part, but as a rule the plants will do in ordinary garden soil, unless it be very heavy. For nooks in the rock garden, few bulbs are better than Puschkinias, and they do well in the herbaceous border, except that they are apt to have the beauty of their flowers spoiled by mud splashes in heavy rain. Although reputedly hardy, it will be well to cover the clumps with leaves or dry litter in winter. Slugs are very destructive of growths just pushing through. The variety compacta makes a charming pot plant for the greenhouse. It may be grown five or six bulbs in a pot, but must be allowed to come along slowly.

Principal Species and its Variety :—

scilloides, 4″ to 8″, spr., wh., striped pale bl., about ¾″ across (*syns.* libanotica, sicula, and Adamsia scilloides). Striped Squill.

— compacta, dwarfer, flowers smaller and more numerous (*syn.* libanotica compacta).

PUSS MOTH.

The larvæ of the Puss Moth (Dicranura vinula) have to be numbered amongst the gardener's enemies, for they attack the leaves of Willows and Poplars, and, when present in quantities, do considerable damage. These larvæ are of peculiar shape. The head is flat, the body is distinctly humped, and the last pair of prolegs are developed into a pair of long, curving horns, which are used to battle with the ichneumon, its natural enemy. The colour is green, with purple lines; the head is black. The full-fed larvæ gnaw for themselves hiding places in the bark of the trees which they infest, spin cocoons, and pass the winter thus. The moths emerge in June. They are nearly 3″ across the forewings, which are grey, while their bodies are large, heavy, and also grey. There are several other species, which, on account of their resemblance to the Puss Moths and their smaller size, are fancifully termed Kitten Moths. They are bifida, the Poplar Kitten, which feeds upon the Aspen and Poplars; furcula, the Sallow Kitten, which attacks Willows; and biscuspis, the Alder Kitten, which selects the Alder, Beech, and Birch.

Remedy, hand picking larvæ and cocoons, with their contained pupæ, and catching the moths.

Purslane Tree (*see Portulacaria*).

PUTORIA.

Two or three species of dwarf, half-hardy, branching shrubs (*ord.* Rubiaceæ). The generic name suggests the strong smell characteristic of the plants. Propagation, by root division in spring. A light and warm, gravelly soil is best.

Principal Species :—

calabrica, 6″, Jy., red (*syns.* Asperula calabrica and Enodea montana).

PUTTERLICKIA.

Two species only of spiny greenhouse shrubs (*ord.* Celastrineæ). Propagation, by layers in autumn. Soil, loam and peat in equal parts, with one-sixth sand.

Principal Species :—

pyracantha, 2′ to 3′, win., grn., pur. disc (*syn.* Celastrus Pyracanthus of *Botanical Magazine* 1167).

PUTTY.

As a rule, only a bottom bedding of putty is now employed in glazing greenhouses; formerly both top and bottom putty was used. Ordinary glazier's putty is made of whiting, worked into a stiff paste with linseed oil. It is creamy white in colour, but after a few weeks' exposure to the air dries to a dead white and sets hard. Red putty may be made by mixing a little red lead with the white putty; it also sets hard. Old white putty may be softened by mixing caustic potash to a paste with water, and spreading it over the putty. More than one application may be necessary. The application of a hot iron to the putty holding the pieces of a broken pane of glass will soften it, and allow it to be cut out with comparative ease.

PUYA (*syn.* POURRETIA in part).

According to Mr. J. G. Baker, this genus (*ord.* Bromeliaceæ) includes fourteen species. All are stove or greenhouse perennial herbs, with spiny leaves, and most of them with showy flowers. All are easy to grow, although, so far, they have not become general favourites. Propagation is by suckers, which are freely produced by old plants, and by seeds. Fibrous loam and peat, in equal parts, with sand, suit for soil. Free drainage and liberal supplies of water are other essentials.

Principal Species :—

chilensis, stem 6′ to 10′ high, Jy., grh., lvs. 3′ to 4′ long, sword shaped, in a rosette (*syn.* coarctata).

— gigantea, taller.

gigas, wh. or ro., spikes 18′ to 20′ high, lvs. tufted, wh. beneath, Agave-like. The affinities of this plant are very uncertain.

lanuginosa, stem 2′ to 3′, Oct., st. or grh., grn., bl., lvs. 2′ to 2½′ long, sword shaped, 100 or more in a rosette, very spiny.

Some species are now referred to Pitcairnia.

PYCNANTHEMUM (*syns.* BRACHYSTEMUM, KOELLIA, and TULLIA. MOUNTAIN MINT).

A genus (*ord.* Labiatæ) of erect growing, hardy perennials of little decorative value. Propagation, by root division in spring. Any ordinary soil.

Principal Species :—

lanceolatum, sum., stems downy.
muticum, 1′ to 1½′, sum., wh., in dense terminal clusters. The whole plant is aromatic (*syn.* pilosum).

PYCNOSTACHYS.

Erect growing stove herbs (*ord.* Labiatæ). Propagation, by root division and by cuttings. Soil, loam two parts, leaf mould one part, and sand.

Principal Species :—

cærulea, 12″ to 15″, Aug., ann., bl.
urticæfolia, 10′, Dec., Feb., per., bl.

botanists do not attach much importance to these distinctions, and the two genera are now merged, but the Pyrethrums have been kept distinct in this work for cultural reasons. Perhaps no section of hardy flowers is in greater favour than this, and it will be long ere the name Pyrethrum is forgotten.

The florists' varieties, for which *see* special list, are all easy to grow in any good garden soil, and they may be propagated by division. They like best, however, to be allowed to remain undisturbed for two or three years, and then, if given annual top-dressings of well-rotted yard dung, they

Photo : Cassell & Company, Ltd.

PYRUS BACCATA (*see p. 253*).

PYRALIDINA.

A group of moths, containing the largest of the Microlepidoptera, and not infrequently like some of the smaller Noctuæ in appearance. They very seldom do injury to garden produce, and are of little importance.

PYRETHRUM.

Description.—Correctly this genus of hardy perennials belongs to the Chrysanthemums (*ord.* Compositæ). Originally the Pyrethrums were separated from the Chrysanthemums because of the presence of a pappus in the shape of an elevated, membranous border, and the fact that the achenes (fruits) are angular, but not winged. Later

flower superbly. By cutting off the first crop of flowers early, and removing the flowering stems to the base, a second crop of bloom may be obtained in the early autumn, but to support the plants over the double strain liberal supplies of liquid manure should be given. Seeds are usually only employed when new varieties are wanted. Tchihatchewii is an invaluable plant for dry banks, and uliginosum is suited in the wild garden; it is generally rather too coarse for the herbaceous border.

The Golden Feather (Parthenium aureum) is invariably treated as an annual, seed being sown in heat under glass, in spring, the seedlings being duly pricked out into boxes or pans to strengthen, and transferred to the open ground about the end

of May. Frequent pinching is needed to keep the plants from flowering and induce them to maintain the dwarf habit that is desired. When Golden Feather is employed for carpet bedding, as it commonly is, this pinching has to be very drastic. As the seed is very minute, it should only be sown thinly. Frequently Golden Feather becomes quite a weed in gardens, thousands of plants making their appearance from self-sown seed, which seems to be able to resist a considerable degree of cold.

Principal Species and Varieties :–

[NOTE.—All are hardy herbaceous perennials. The colours refer to the ray or guard florets.]

achilleæfolium, 2′, sum., golden yel.
— pubescens, larger heads (correctly Chrysanthemum achilleæfolium).
corymbosum, 1′, Jy., wh. (correctly Chrysanthemum corymbosum).
parthenifolium aureum, sum., wh., lvs. yel. (correctly Chrysanthemum præaltum). Golden Feather.
— aureum selaginoides, lvs. more finely cut, very handsome.
— glaucum, glaucous lvs.
Parthenium, 2′, Je., wh.; the whole plant is strongly scented (*syn.* Matricaria Parthenium. correctly Chrysanthemum Parthenium). Common Pellitory or Feverfew.
roseum, 1′ to 2′, sum., ro., lvs. rich grn. The flower heads are used in the manufacture of insect powders. (Correctly Chrysanthemum coccineum roseum). This has given rise to innumerable vars., for a selection of which *see* special list.
Tchihatchewii, 2′, early sum., wh. (correctly Chrysanthemum Tchihatchewii).
uliginosum, 5′, Aug., wh., 2″ across; a strong grower (correctly Chrysanthemum uliginosum). Great Oxeye.

Other Species :—

decaisneanum, 1′ to 1½′, aut., pale yel. (correctly Chrysanthemum decaisneanum).
diversifolium (now Brachycome diversifolia).
frutescens (*see* Chrysanthemum frutescens).
lacustre, 2′ to 2½′, sum., wh., 2″ across, solitary (correctly Chrysanthemum lacustre).
marginatum, aut., yel (correctly Tanacetum marginatum).
Mawii, Aug., wh., ro. flushed, rootstock woody.
multifidum, 1½′ to 2′, sum., wh., like Marguerites (correctly C. multifidum).
starckianum, 1′, wh., lvs. much cut, Alpine.

Garden Pyrethrums.—These fall naturally into two sections—singles and doubles. Both have their uses, and both are exceptionally useful for cutting.

Singles :—

Agnes Mary Kelway, ro.
Amoret, pur.
Apollyon, pk.; a good late bloomer.
Ascot, peach.
Dawn, wh.
Decoy, sc.
Feversham, wh.
General Buller, car.
Golconde, crim.
James Kelway, cardinal.
Lugra, rosy pur.
Oliver Twist, cream.
Ornement, vio., cerise.
Roland, lil.
Twilight, creamy wh.
Vésuve, blood red.
Yellowstone, lemon.

Doubles :—

Alfred, crim.
Aphrodite, wh.
Beauty of Laeken, Anemone-flowered, crim.
Carl Vogt, wh., very early.
Cleopatra, yel., wh.
King Oscar, crim., sc.
Melton, crim.
Othello, vio., yel. tips.
Ovid, dark ro.
Pericles, golden yel.
Princess Beatrice, pk.
Shotover, pk., very large.
Triomphe de France, crim. red, shaded pur.
Wega, buff, yel., ro.

Photo : Cassell & Company, Ltd.

PYRUS FLORIBUNDA (*see p.* 253).

PYROLA. (Wintergreen.)

Hardy perennial herbs (*ord.* Ericaceæ), some of them stemless and one species leafless. Several species make handsome garden plants, and may be planted in shaded nooks in the rockery and hardy fernery. They will do also in thin shrubberies, provided they can get a free supply of water. Propagation, by division as growth is starting in spring. A rather light and sandy soil, containing, however, plenty of humus, is to their liking; they will not thrive in heavy, clayey media.

Principal Species :—

rotundifolia, 6″, sum., hdy., wh., fragrant, good for rockwork; British.
— arenaria, lvs. smaller than type, good for rockwork; British sea shores.
secunda, Jy., grn., wh.; British.

Other Species :—

elliptica, 6″, Je., Jy., wh., fragrant.
maculata (now Chimaphila maculata).
media, 4″, Jy., Aug., wh., flushed red; British.
minor, 8″ to 12″, Je., Aug., wh., tinged red, lvs. nearly round.
umbellata (now Chimaphila umbellata).
uniflora (now Moneses grandiflora).

PYRULARIA (*syns.* Hamiltonia and Sphærocarya).

Three species only of deciduous trees and shrubs (*ord.* Santalaceæ). Pubera, the only species yet in cultivation in this country, may be increased by cuttings, and thrives in a sandy, loamy soil.

Principal Species :—

pubera, 3′ to 12′, My., hlf-hdy., grn., in small spikes; fruit a drupe, containing a good deal of acrid oil (*syn.* oleifera). Buffalo, Elk, or Oil Nut.

PYRUS.

Description.—It would be difficult to exaggerate the importance of this genus of trees and shrubs (*ord.* Rosaceæ), which, although not very large with regard to the number of species it contains, is yet very comprehensive. Included in it are such fruits as the Apple and Pear, whilst most of the species and varieties are handsome flowering subjects, which would be sadly missed from our lawns and shrubberies. All the species are hardy, and most of them will withstand our most severe winters with impunity. Aucuparia and its varieties, also baccata, Aria, and Malus and its varieties, make handsome lawn trees, and some of the varieties of Malus take kindly to pot culture, and may be forced gently into flower for the conservatory. Hard forcing invariably causes the buds to drop.

Propagation.—By seeds, cuttings, and grafting. (For particulars, *see* Apple and Pear.)

Soil.—A deep loam of medium texture is the favourite soil, but most of the Pyruses will do in any soil from very light to very heavy.

Division of Genus.—The genus includes Malus, Sorbus, Cydonia, and Mespilus, as well as part of Aronia. It may be conveniently divided into seven groups or sections, viz. (1) Pyrophorum, typified by communis, the Pear; (2) Malus, which may be represented by baccata and Malus, the Apple; (3) Aria, in which are Aria, the White Beam Tree, and Torminalis; (4) Sorbus, which includes Aucuparia, the Mountain Ash or Rowan, and Sorbus; (5) Adenorachis, which includes arbutifolia; (6) Cydonia, of which japonica is the typical species; and (7) Mespilus, where germanica, the Medlar, must be placed. There has been much shifting about of the various genera, and thus each plant has, as a rule, a goodly list of synonyms. A few only of these are given.

Pyrolirion (*see Zephyranthes*).
Pyrrheima (*see Tradescantia*).
Pythonium (*see Thomsonia*).

Principal Species and Varieties :—

[Note.—The synonymy is that of the *Kew Hand-List*.]

arbutifolia, 2′ to 10′, My., Je., hdy. shr., wh. or flushed pur., fruits red or pur., Pear shaped (*syns.* Aronia pirifolia, Azarolus and Sorbus arbutifolia). Choke Berry.
— melanocarpa, lvs. larger, dark pur. fruits (*syn.* grandifolia).
Aria, 4′ to 40′, My., Je., hdy., lvs. deeply lobed, wh. beneath, fruits dotted red, ½″ across, British (*syns.* badensis of gardens, meridionalis, odorata of gardens, Mespilus Aria, etc.). White Beam Tree. There are many vars., of which those named below are some of the best :—
— chrysophylla, lvs. yel.
— latifolia, lvs. broad with deltoid lobes.
— rupicola, fruits nearly car., lvs. very wh. beneath.
Aucuparia, 10′ to 30′, My., Je., hdy., cream wh., fruits sc., flesh yel., lvs. 5″ to 8″ long, pinnate; British (*syns.* Aucuparia sylvestris, Mespilus Aucuparia, and Sorbus Aucuparia). Rantry, Rhoddon or Roan Tree, Mountain Ash, Rowan Tree. Many vars., including :—
— atropurpurea, fruits very large, dark red.
— fastigiata, upright habit.
— foliis-aureis, lvs. yel.
— fructu luteo, fruits yel.
— pendula, branches weeping.
— rossica fructu dulcis, fruits sweet.
— variegata, lvs. variegated.
baccata, 15′ to 20′, Ap., My., hdy., wh., fruits yel., red, as large as a big Cherry. The pulp is used in Siberia for making quasar punch, and in England for making jelly. A beautiful lawn tree (*syns.* tartarica of gardens, Malus baccata, cerasifera, and rossica). Siberian Crab. The vars. aurantiaca, edulis, lutea, microcarpa, obconoidea, præcox, striata, and xanthocarpa are good (*see p.* 251).
Chamæmespilus, 5′ to 6′, My., Je., hdy. shr., red, fruits red, round (*syns.* Aria, Aronia, Mespilus, and Sorbus Chamæmespilus). Bastard Medlar, Bastard Quince.
— Hostii, 10′, spr., rosy pk. (*syns.* Aria and Cratægus Hostii).
communis, 20′ to 40′, Ap., My., hdy., wh., fruits pyriform. Several vars., including cotinifolia, flore pleno, and pendula. Wild Pear.
coronaria, 20′, My., hdy., ro., fruits grn., fragrant, lvs. ovate or heart shaped (*syns.* Cratægus and Malus coronaria, and M. microcarpa coronaria).
— flore pleno, double (*syn.* angustifolia fl. pl. of gardens). Sweet-scented Crab.
cratægifolia, spr., wh., fruits red, elliptic.
Cydonia, 20′, My., Je., wh. or pale red (*syns.* Cydonia lusitanica and vulgaris and Sorbus Cydonia). Common Quince.
floribunda, My., hdy., rosy red, very free, fruits nearly round. One of the best of hdy. flowering shrubs (*syns.* Malus floribunda and microcarpa floribunda, *see p.* 252).
— flore pleno, double (*syns.* halleana and Parkmannii of gardens).
— Scheideckeri, semi-double, floriferous; thought by some authorities to be a hybrid (floribunda × prunifolia).
japonica, 5′ to 6′, spr., sum., hdy., deep sc., large, showy, fruits large, grn., fragrant, but not edible, ripe in Oct. (*syns.* Chænomeles and Cydonia japonica, C. lagenaria, C. speciosa, and Malus japonica,

not P. Cydonia of Linnæus). There are several vars., including a wh. and double crim., cardinalis, with large, richly coloured flowers, very early; and Knap Hill Scarlet, very fine.

Malus, 20′, My., hdy., pk., wh., fruits yel.; Britain (*syns.* Malus communis and sylvestris, *see also* Apple). Crab, Wild Apple.

— aurea, lvs. yel., grn.

— Bertinii, very free fruiting.

— coccinea, car.

— John Downie, red, yel., very fruitful.

— mitis, young lvs. hairy.

— neidwetzkyana, large flowers, wood pk.

— sempervirens. Evergreen Crab.

Other good vars. are nervosa, pendula, and rosea.

Maulei, 2′ to 2½′, Ap., sc., hdy., but does best in a sheltered place, fruits golden yel., ripe in autumn; an excellent preserve is made from them (*syns.* Chænomeles alpina and Maulei, and Pseudochænomeles Maulei). Referred by *Index Kewensis* to japonica; vars. Leichtlini and superba are larger, and brighter than the type.

prunifolia, 20′ to 30′, Ap., My., hdy. tree, wh., fruits yel., red, astringent (*syns.* Malus hybrida and prunifolia). Many vars., including flore pleno, fructu dulcis, fructu coccineo, fructu striato, and pendula. Siberian Crab.

sinensis, Ap., wh., like communis, but has longer branches and almost ev. lvs. The young lvs. have a bronze red hue in spring, and the tree is very effective then (*syns.* chinensis, communis var. sinensis, and ussuriensis). Sand Pear, Snow Pear.

Sorbus, 20′ to 60′, My., hdy., cream, fruits red spotted, 1″ long, very astringent (*syns.* domestica, serrulata of gardens, Cormus domestica, and Sorbus domestica). True Service Tree.

spectabilis, 20′ to 30, Ap., My., hdy., pale red, large, inclined to come semi-double (*syns.* japonica floribunda and Malus chinensis of gardens, M. sinensis, and spectabilis, *see p.* 255).

— flore albo, wh.

— flore pleno, double.

— Kaido, blush red, fruits said to be edible if bletted (*syn.* pyramidalis grandiflora of gardens).

— magnifica, deep rosy pk., an improvement.

Toringo, My., hdy., wh. or ro., fruits small (*syns.* P. Malus Toringo, Sieboldii, Malus rivularis and spectabilis Toringo, and Sorbus Toringo). There is a double-flowered var. Toringo Crab.

Other Species and Varieties :—

americana, Je., hdy., red, fruits red, globose, small (*syns.* P. Sorbus polonica of gardens, Sorbus americana, humifusa, etc.). American Mountain Ash.

— microcarpa, smaller fruits (*syns.* microcarpa, Sorbus americana microcarpa, and riparia).

auricularis, 20′, Ap., wh., fruits or. yel., lvs. ovate (*syns.* bollwylleriana, irregularis, Pollveria, tomentosa, and Lazarolus Pollverii).

betulæfolia, spr., hdy. shr., wh., anthers deep red, fruits br., dotted wh.

Botryapium (*see* Amelanchier canadensis).

cordata, spr., hdy., wh., fruits small, globose or pyriform (*syns.* boisseriana, communis azarolifera and c. Briggsii).

elæagnifolia, My., hdy., wh., fruits small, globose, lvs. covered with silky wh. hairs. The *Index Kewensis* gives this as elæagrifolia.

fennica (*see* pinnatifida).

leucocarpa, wh., fruits depressed at the top and base, wh. or cream.

nivalis, My., hdy., wh., fruits yel., grn. (*syn.* salvifolia). Snow Tree.

— variegata, variegated lvs.

Pashia, My., wh., pk., lvs. usually ovate, sometimes three-lobed (*syns.* nepalensis of gardens and variolosa).

pinnatifida, flowers like Aucuparia, lvs. partly pinnate (*syns.* fennica and hybrida).

Ringo, close to Toringo, but with lvs. more deeply cut (*syns.* Malus microcarpa Ringo, and P. Toringo Ringo). Vars. fastigiata bifera, and sublobata.

salicifolia, 20′, My. Je., hdy., wh., lvs. narrowly lanceolate, silvery beneath (*syn.* orientalis of gardens).

sambucifolia, Je., larger than americana, but close to that species, probably only a var. of it.

sikkimensis, hdy., pale pk., fruits dark red, excellent when stewed (*syn.* Pyrus baccata indica).

Simonii, spr., hdy., wh., fruits yel., nearly round, 2″ across, habit erect.

spuria, 20′, lvs. pinnate, a supposed hybrid (Aucuparia × arbutifolia, *syns.* hybrida, Amelanchier pinnata of gardens, Aronia and Cratægus sorbifolia).

Torminalis, 10′ to 50′, Ap., My., hdy., wh., fruits usually pyriform, grn., br., lvs. 2″ to 4″ long, usually heart shaped: Britain (*syns.* Cratægus and Sorbus Torminalis, Torminaria Clusii and vulgaris). Wild Service.

ussuriensis (*see* sinensis).

vestita, 10′ to 18′, My., Je., wh., of pyramidal habit (*syns.* Aria nepalensis, Pyrus crenata, and nepalensis of gardens, Sorbus magnifica and nepalensis of gardens, and S. vestita). Himalayan Beam Tree.

PYXIDANTHERA.

The only species (*ord.* Diapensiaceæ) is a very small, prostrate, hardy herb or sub-shrub, at its best when allowed to ramble in a sunny situation in the rockery. Propagation, by cuttings in a close, but not heated, frame. Soil, very sandy loam.

Only Species :—

barbulata, 2″, early sum., wh. or ro., solitary (*syn.* Diapensia barbulata). Pine-barren Beauty.

QUALEA.

Stove trees and shrubs (*ord.* Vochysiaceæ), with leathery, Laurel-like leaves and curious flowers which have usually only one perfect petal and one perfect stamen. Propagation, by cuttings in summer. Soil, peat, loam, leaf mould, and sand.

Principal Species :—

rosea, 30′, sum., ro., wh.

QUAQUA.

A monotypic genus (*ord.* Asclepiadeæ). The species, Hottentotorum, is a small, succulent-stemmed, greenhouse plant, with a bushy habit and curious purple or yellowish flowers. Increase is by cuttings. Soil, well-drained sandy loam, in a dry, sunny position. It must be kept on the dry side throughout the winter.

QUASSIA.

A small genus (*ord.* Simarubeæ). Amara, the principal, requires a stove temperature, being a native of Guiana. It forms a tree 20′ in height, resembling the Ash in habit. The leaves are interesting on account of the curious winged stalks. The flowers, in late summer, in large, terminal racemes, are bright scarlet in colour. The bitter wood has been used in fever and dysentery, and also as a tonic. Quassia chips are not the product of this plant, but of the Jamaica Quassia, Picræna excelsa. Propagation, by cuttings of half-ripe shoots in sandy soil in a close case. Soil, two parts loam and one part leaf mould, with sand.

Quadriala (*see Buckleya*).
Quaking Grass (*see Briza*).
Quamoclit (*see Ipomœa*).
Quebec Oak (*see Quercus alba*).
Queen Lily (*see Phædranassa*).
Queen of the Meadows (*see Spiræa Ulmaria*).

QUEKETTIA.

A genus (*ord.* Orchidaceæ) containing one epiphytal species. Microscopiaca, a Brazilian plant, requiring similar treatment to Pleurothallis, grows 3″ or 4″ high, and bears minute, yellow flowers.

QUENOUILLE.

A term applied to a particular method of training sometimes adopted for fruit trees on walls or trellises. A central branch is encouraged to grow to the top of the support, and the side branches are trained horizontally at equal distances apart from base to summit. The peculiarity of the method is that the lowest branches are allowed to extend for a considerable distance from the trunk, each higher tier being a little shorter than the one directly below, so that when the tree is finished a pyramidal habit is produced.

Quercitron (*see Quercus tinctoria*).

QUERCUS.

Description.—A genus of deciduous and evergreen trees and shrubs (*ord.* Cupuliferæ), the majority of which are hardy, and of value on account of their timber and ornamental character. Of the 300 known species the two most common examples are the common British Oak (Quercus Robur) and the Turkey Oak (Quercus Cerris). The former makes one of the most stately, ornamental, and picturesque forest trees. It is divided into the two species pedunculata and sessiliflora. These are distinguished by the former having stalks to the acorn-cups and none to the leaves, and the latter by having no stalks to the acorn-cups and stalks to the leaves. Intermediate stages are to be found. Pedunculata is the more common. Many varieties are in cultivation. Lucombeana, one of the best, makes a large, noble-looking tree with sub-evergreen leaves. The Holly or Holm Oak is the most important of the evergreens, as it

Photo: Cassell & Company, Ltd.

PYRUS SPECTABILIS (*see p.* 254).

makes a handsome tree. In the colder parts it does not grow well. It is a variable species, the leaves differing largely in size and shape. Some species, especially coccinea, prinoides, and rubra, are very useful for gardens or parks on account of the brilliant autumnal colour of the leaves. Knap Hill Scarlet, a variety of coccinea, is particularly fine, the leaves hanging almost until Christmas.

Other Cultural Points.—Young Oaks should have the leading shoots kept clear and the lower branches gradually removed to form tall trees, as Oaks generally show a tendency to become mop-headed if left to themselves. Where thick planting is done, this is not required.

Uses.—The greatest value of the Oak, economically, is for its timber, sound English Oak always commanding a good price. Although not used to the same extent as formerly, the bark is still of value for tanning. In Spain and Portugal the Cork Oak (Suber) is grown extensively for the bark, the cork of commerce. This Oak will live in the neighbourhood of London, but does not thrive so well as the Holm Oak. It is usually regarded as a curiosity, and its stunted appearance is often remarked. The Holm Oak is an excellent town tree, although frequently rather untidy.

Photo : Cassell & Company, Ltd.

QUERCUS CONFERTA (*see p. 257*).

Distribution.—The majority of the hardy Oaks are North American, Japanese, and European, but Oaks are in cultivation from India, China, South America, etc.

Propagation.—By acorns sown as soon as possible after they are ripe. Rare varieties are grafted. If inconvenient to sow when ripe, the seed should be stored in sand. In a dry place it quickly loses its vitality.

Soil.—Well-drained loam.

Principal Species and Varieties :—

Cerris, 50′ to 70′, lvs. deeply toothed, acorn-cups mossy. Turkey Oak.
— cana major, 30′, evergreen.
— cana minor, 20′.
— fulhamensis, 60′, ev. or sub-ev.
— fulhamensis latifolia, lvs. large.
— laciniata, lvs. pinnatifid.
— lucombeana, 60′ to 70′, lvs. retained until midwinter.
— variegata, lvs. variegated.
coccinea, 50′ to 70′, lvs. deeply lobed, useful for single specimens.
conferta, 70′, lvs. large with numerous, very regular teeth (*see p.* 256).
Ilex, 60′, lvs. small, ev. Holly, Holm, or Evergreen Oak.
— crispa, lvs. fringed.
— diversifolia, lvs. malformed, differing greatly in shape.
— Fordii.
— latifolia, lvs. large.
— rotundifolia, lvs. round.
macrocarpa, 40′, lvs. large with very few lobes. Burr Oak.
Mirbeckii, 50′ to 70′, lvs. large, regularly toothed, very ornamental (*syns.* grossedentata, lusitanica var. bœtica, ventricosa, and Zang.).
Robur, 100′ to 120′. Common Oak. By most authorities this is now dropped and the two divisions, pedunculata and sessiliflora, formerly kept up as sub-species, are now raised to specific rank as follow :—
pedunculata, 100′ to 120′, lvs. sinuate without stalks, acorn-cups with stalks.
— fastigiata, habit of Lombardy Poplar.
— filicifolia, lvs. deeply pinnatifid.
— heterophylla, lvs. very deeply divided.
— pendula, pendulous branches.
sessiliflora, 100′ to 120′, lvs. sinuate with stalks, acorn-cups without stalks.

Photo: Cassell & Company, Ltd.

QUERCUS HETEROPHYLLA (*see p.* 258).

— afghanistanensis, 30′ to 40′, sub-evergreen.
— cochleata, 40′, edges of lvs. curved upward.
— devoniana, 40′ to 50′, lvs. smaller.
— rubicunda, 40′, lvs. reddish.
rubra, 60′, lvs. large, smooth, bark grey. Red Oak.

Other Species and Varieties :—

acuta, 10′, ev. (*syns.* angustifolia, Buergerii, cuspidata latifolia, and marginata).
— bambusæfolia, lvs. narrower.
Ægilops, 40′ to 50′ (*syns.* græca and ventricosa). Vallonia or Velani Oak.
agrifolia, 20′, lvs. oval, warted. Enceno Oak.
alba, 60′, lvs. large and handsome. White Swamp Oak.
alnifolia, 10′ to 12′, grh., ev., lvs. oval with golden under surface, very rare.
Ballota, 50′, ev., lvs. small, rounded (*syns.* cyclophylla and rotundifolia). Barbary Oak.
bicolor, 60′, lvs. large, few lobes (*syns.* castaneæfolia of gardens, pannosa, platanoides, and Prinus var. bicolor). Swamp Oak.
castaneæfolia of C. A. Meyer, 60′, Chestnut-leaved.
cinerea, 20′, narrow, small. Upland Willow Oak.
coccifera, 15′, ev., lvs. small, spiny. Kermes Oak.
cuspidata, 30′, ev., bushy habit.
– variegata, lvs. variegated.
dentata, 30′, lvs. very large, requires a sheltered position (*syns.* Daimyo and obovata).
glabra, 10′, ev.
glandulifera, 40′, ev.
glauca, 30′
heterophylla, 40′, lvs. long, narrow (*see p.* 257).
ilicifolia, 8′ (*syns.* Banisteri, discolor var. Banisteri, and nana). Black Scrub Oak.
imbricaria, 40′, Laurel-leaved (*syns.* Castanea and laurifolia of gardens and Phellos var. imbricaria).
incana, 40′, grh., lvs. whitish.
Kelloggii, 30′.
lanuginosa, 30′, lvs. small, woolly on under side (*syns.* ajudaghensis, budayana, collina, conglomerata, cupaniana, faginea, etc.).
laurifolia of Michaux, 40′.
Libani, 30′, lvs. small, ovate.
lyrata, 50′, lvs. long, few lobed.
marilandica, 20′, lvs. wide, distinct.
nigra, 10′ to 25′, lvs. cuneate. Black Jack Oak.
palustris, 60, lvs. pinnatifid. Pin Oak.
Phellos, 50′, lvs. long, narrow. Willow Oak.
prinoides, 8′, dwarf shr., suitable for undergrowth (*see p.* 259).
Prinus, 20′ to 90′. Chestnut Oak.
Pseudo-suber, 50′, ev. False Cork Oak.
reticulata, 10′ to 20′, grh.
serrata, 20′, lvs. long, serrate.
stellata, 50′, under side of lvs. covered with whitish felt.
Suber, 25′, ev. Cork Oak.
Toza, 40′, lvs. and young stems densely clothed with silky hairs.
— splendens, finer.
Turneri, 40′, ev., lvs. large, hybrid.
velutina, 40′, lvs. large.
— rubrifolia, lvs. very large and ornamental. Champion Oak.

QUESNELIA.

Interesting stove plants (*ord.* Bromeliaceæ), with long, leathery leaves bordered with strong spines. The flowers are showy. Propagation, by suckers in spring, in a close, moist temperature. Similar culture to Billbergias and Tillandsias will suit.

Principal Species :—

rufa, 1½′, Jan., bracts ro., flowers bl.
strobilospica, 2′, spr., vio.
Van Houttei, 2′, spr., vio. (*syn.* van houttеana).

QUICK.

A term applied to the Whitethorn, Cratægus Oxyacantha, when used as a hedge plant. Quicks for hedges should be raised from seeds and grown for two or three years in nursery quarters. Select those about 2′ in height with clean, sturdy stems. The ground should be trenched, and if poor enriched with well-rotted manure. For an ordinary hedge the plants may be placed from 12″ to 15″ apart in a single row, but where strong hedges are required a double row should be made, placing the plants 18″ apart, the plants in the two rows alternating with each other. When well established they should be cut down to a few inches of the ground, to obtain a good bushy habit. They should be clipped twice a year. (*See also* HEDGES and PLASHING.)

QUILLAJA. (SOAP TREE.)

South American trees (*ord.* Rosaceæ) of economic value. Saponaria, 60′, is the most important. It is an evergreen with small, oval leaves and white flowers. The inner layers of the bark are very rich in soapy matters. Propagation, by cuttings. Soil, sandy loam. It grows well on a wall out of doors in the warmer parts of England.

QUINCE.

Description.—A popular name applied to Pyrus Cydonia (*syn.* Cydonia vulgaris, *ord.* Rosaceæ). It is one of the oldest of cultivated exotic trees, and has become so widely distributed, and in many places naturalised, that its native country is not known. Most gardens of any pretensions possess one or more trees. It forms a low, spreading tree, and produces fruits which, when ripe, are very fragrant and yellow. These are used for preserves or for mixing with other fruit. Quinces are employed as stocks on which to graft Pears, as, being naturally fibrous, surface-rooting trees, they make much better stocks than the ordinary Pear.

Propagation.—By seeds, cuttings, or layers. Seeds must be sown out of doors as soon as ripe, first mixing them with red lead to keep away mice. Cuttings should be made in August and inserted in the open ground. Layers may be put down in the ordinary way.

Soil.—A warm, sandy loam.

Other Cultural Points.—Young plants intended for grafting should be grown in rich soil and encouraged to make clean, healthy wood. Grafting can generally be performed about the second or third year. Plants that are to be grown into trees must be carefully pruned when young to help them to make a good head.

Principal Quinces :—

Chinese (Pyrus cathayensis).
Common (*see* Pyrus Cydonia).
— lusitanica, fruit very large.
— maliformis, fruit Apple shaped.
— marmorata, lvs. variegated.
— pyriformis, Pear shaped.
Japanese (*see* Pyrus japonica).
Maule's (*see* Pyrus Maulei).

QUINCUNX.

A method of planting. The plants are placed in rows, those in the first, third, and fifth rows being exactly opposite each other, whilst the plants in the second and fourth rows stand opposite each other and between the plants in the other rows.

Quickset (*see Quick and Cratægus*).
Quillwort (*see Isoëtes*).
Quina, Quinquina, and Quino (*see Cinchona*).
Quince, Bengal (*see Ægle Marmelos*).

When the planting is finished, straight lines are shown whatever point of view is selected.

QUISQUALIS.

Stove, climbing shrubs (*ord.* Combretaceæ), with opposite, oblong leaves and terminal clusters of orange red flowers. Propagation, by cuttings in sandy soil in a close case with a brisk bottom heat. Soil, equal parts fibrous peat and loam with plenty of grit.

Principal Species :—

indica, 20′, Je., or. red.

Photo : Cassell & Company, Ltd.

QUERCUS PRINOIDES (*see p. 258*).

QUIVISIA.

Heterophylla is the only introduced species of this genus (*ord.* Meliaceæ). It is a small, evergreen, stove tree, 20′ high, with large leaves and white flowers. Propagation, by cuttings of ripened shoots in sand in a warm case. Soil, sandy loam.

RADISH.

It is possible, by a little management, to have Radishes (Raphanus sativus, *ord.* Cruciferæ) all the year round. From mid-October until the end of February the seed must be sown under glass, for the plants are tender, but at other times open air sowings are the rule.

For under-glass Radishes it is well to make up shallow hotbeds, upon which soil 6″ deep may be placed, the whole being covered with a frame. Broadcast sowing is preferred in such cases to drilling. A common plan is to sprinkle a little Radish seed between the rows of frame Potatoes. The Radishes are off the ground before the Potatoes call for much room.

For outdoor sowings the middle of March is soon enough, and even then it is necessary to choose a warm and sheltered spot. It will also be advisable to have a little dry straw, hay, or Bracken at hand, to cover the plants if frost threatens. The main, summer crops should be sown in cooler spots, or the roots will be tough and strong, and will quickly run to seed. The soil in all cases should be rich and well broken up. Drilling is the method generally favoured, as it is possible to get a row of Radishes in many an odd corner—as an edging to walks, between the rows of other crops, etc. The drills should be very shallow, the seed being only just covered. Make small and frequent sowings, so as to keep up the succession. Thinning the young plants at an early stage is occasionally resorted to. Round, oval, and long roots are available. The long varieties are not suitable for late sowings, as they go "strong" very quickly in the height of the summer.

The Black Spanish Radish should be sown in July, in drills about 9″ or 10″ apart, the plants being thinned to 6″ apart. The roots are lifted in November, and stored in sand or dry soil for use in winter. The core of the roots is tough and strong, and is generally rejected when preparing the roots.

Varieties. A Selection :—

Round and Oval :—

*Crimson Forcing.
*Deep Scarlet Olive shaped Extra Early.
French Breakfast.
Red Turnip-rooted.
Scarlet Globe.
*White Olive.

Quinine (*see Cinchona and Remijia*).
Quinsy Berry (*see Ribes nigrum*).
Rabbit Berry (*see Shepherdia argentea*).

Long-rooted :—

Black Spanish, for winter use.	Long White.
	Long Rose.
*Wood's Early Frame.	The Sutton.

* May be used for forcing.

Enemies.—The Radish has many enemies. Of Fungi, there are the White Rust (Cystopus candidus) and Mildew (Peronospora parasitica). As a rule these are not very troublesome, and badly attacked crops may be sacrificed without serious loss. Amongst insect pests Millipedes and the larvæ of some Night Moths occasionally give trouble, as do also the Turnip Fly and the larvæ of the Cabbage Fly. The most troublesome insect, however, is Anthomyia Radicum, the Radish Fly, whose yellow, fleshy, wrinkled larvæ eat into the roots, and afterwards pupate in the soil. Watering with carbolic acid mixture is recommended; it is prepared by mixing ½ pint of the acid with about 1 gallon of boiling water in which 1 lb. of soft soap has been dissolved, and diluting to 50 gallons. Gas lime may be sprinkled between the rows, 3 oz. or 4 oz. to the yard.

RAFNIA.

Greenhouse shrubs and sub-shrubs (*ord.* Leguminosæ) from South Africa. The flowers of all the known species are yellow, and the leaves entire. Few of the Rafnias are cultivated outside botanic establishments. Propagation, by seeds and cuttings.

Principal Species :—

angulata, 1′ to 1½′, My., sub-shr. (*syn.* filifolia).
elliptica, 1′ to 3′, Je., shr.
triflora, 2′ to 4′, Je., shr. (*syn.* Crotalaria triflora of *Botanical Magazine* 482).

RAGS.

Waste cloth and rags have been turned to value as a manure. They are finely shredded, and sold as "shoddy" from cloth factories. Applied at the rate of about 3½ lb. per square pole—5 cwt. per acre—shoddy is an excellent application for heavy land, but is not to be recommended for light soil. Hops seem to like it particularly well. Fruit plantations, too, find it helpful.

RAILLIARDIA.

Greenhouse shrubs (*ord.* Compositæ). Propagation, by seeds and cuttings. Soil, two parts loam, one part leaf mould, and sand.

Only Species Introduced :—

ciliolata, 2′, Jy., grh., yel., rayless branches covered with velvety hairs.

RAIN GAUGE.

An instrument for determining the rainfall in any place during a given period. The water is conducted into a receiver by means of a funnel which has a large collecting surface, and is protected by an upright rim. At stated hours the receiver is emptied into a graduated vessel, and the amount carefully noted. Evaporation from the receiving vessel is guarded against. Snow is first melted and then calculated as water.

Raffia (*see Raphia*).
Ragged Robin (*see Lychnis Flos-cuculi*).
Ragwort (*see Othonna and Senecio Jacobæa*).
Ragwort, Sea (*see Cineraria maritima*).
Rain Berry (*see Rhamnus*).
Rainbow Flower (*see Iris*).

RAIN WATER.

Of greater value in gardens than water from springs, as it is generally warmer, contains more oxygen, less lime, and has, when fresh, traces of nitric acid, collected from the air.

RAKES.

Rakes of various sizes occupy an important position in the garden. The wooden rake, whose head varies from 1½′ to 2′ long, is almost indispensable in the autumn for leaf collecting. The teeth in these rakes need to be frequently replaced. This gives very little trouble, as the teeth are simply knocked into holes pierced in the head until they are firm, afterwards being cut to the required length.

It is in the preparation of seed beds that the iron rake comes mainly into play. Here the soil has to be levelled and broken up finely, stones and other rubbish being removed. Three sizes—6″, 10″, and 12″—are usually needed; the dimensions refer to the length of the head. A stout Ash handle is commonly provided.

A special make of rake with broad, flat teeth, sharp at both edges, is sometimes used for scratching up Daisies from lawns, but the process is rather of the "rough and ready" order.

RAMONDIA (*syns.* CHAIXIA, JANKÆA, and MYCONIA).

Charming hardy perennial, Alpine plants (*ord.* Gesneraceæ), prized for rock gardens or for shady walls. They form close-growing plants, with small stems bearing a few pretty flowers. Propagation, by seeds, sown in pots under glass in spring, or in crevices in rockwork or walls; also by division. Seedlings grow slowly, and small plants ought not to be divided. Soil, rough peat and loam in equal parts, with some limestone or mortar rubbish, except for serbica var. Nathaliæ, which dislikes lime. Ramondias will grow on a south or south-east aspect if they have plenty of water daily in summer and in dry weather in spring.

Only Species and Varieties :—

Heldreichii, 3″, sum., vio. (*syn.* Jankæa Heldreichii).
pyrenaica, 6″, sum., vio. pur. (*syn.* Verbascum Myconi). (*See p.* 261.)
— alba, wh.
serbica, 4″, sum., vio.
— Nathaliæ, darker flowers (*syn.* Nathaliæ).

RAMPION.

Under this name the white, fleshy roots of Campanula Rapunculus, a hardy biennial (*ord.* Campanulaceæ), are sometimes cultivated. Seed should be sown in May—if earlier the plants quickly run to seed—in very shallow drills 9″ to 12″ apart. A moist, rich soil, in a shady position, should be selected. The plants must be thinned at an early date to 6″ or 8″ apart. The roots are available for winter use.

RANDIA (*syns.* CUPIA, OXYCEROS, and STYLOCORYNA).

A genus of stove, climbing or erect, evergreen trees and shrubs (*ord.* Rubiaceæ). Several have large and showy flowers, and make elegant pot plants. Propagation, by cuttings of the young

Raisin Tree, Japanese (*see Hovenia dulcis*).
Rajania (*see Brunnichia*).
Ramoon Tree (*see Trophis*).

growths taken with a heel of the old wood attached, in spring, and rooted in sandy soil, in a close frame, with brisk bottom heat. Soil, equal parts of fibrous loam and peat, with one-eighth sand. Firm potting and free drainage, and a free use of the syringe are desirable. Old plants must be cut hard back after flowering, and kept in a close pit to induce them to break freely.

Principal Species :—

macrantha, 9′ to 30′, Je., cl., yel. (*syns.* bowieana of *Botanical Magazine* 3809, and Gardenia devoniana of *Botanical Register* 1846, 63).

maculata, 2′ to 5′, Jy., wh. (*syn.* Gardenia stanleyana of *Botanical Magazine* 4185).

Ramondia pyrenaica (*see p.* 260).

Other Species :—

aculeata, 12′, Jy., wh. (*syn.* Gardenia Randia of *Botanical Magazine* 1841). Indigo Berry.

Dumetorum, 5′, Jy., wh., yel. (*syns.* floribunda, Canthium chinense, and C. coronatum).

fasciculata, 4′, Jy., wh., sweet scented.

floribunda (*see* Dumetorum).

horrida, 5′, My., wh., fruits blk

malleifera, 4′ to 6′, Jy. (*syns.* Gardenia malleifera of *Botanical Magazine* 4307 and Whitefieldii).

rotundifolia, 6′, Jy., wh., fruits yel.

RANUNCULUS. (Crowfoot, Buttercup.)

Description.—A large genus of annual and perennial herbs (*ord.* Ranunculaceæ), comprising a considerable range of forms, from the lowly Buttercup to the stately cortusæfolius. The number adapted for the garden is so large that only a selection can be given. Many species are of considerable beauty in the border, a good number are charming Alpines, and one, asiaticus, has long been grown as a florists' flower and is treated of separately below.

Propagation.—By seeds, sown in spring, or when ripe, in pans or in the open in the reserve garden; and by division in autumn or early spring.

Soil.—For the border plants, moist and rather heavy; the Alpines like moist peat or loam, leaf soil, and sand, in equal parts.

Principal Species and Varieties :—

[Note. — All hardy perennials, except where otherwise indicated.]

aconitifolius, 9″ to 24″, My., wh.
— grandiflorus, larger flowers.
— plenus, double. Bachelor's Buttons, Fair Maids of France, or Fair Maids of Kent.
alpestris, 3″ to 6″, Je., wh.
— Traunfellneri, wh.
amplexicaulis, 3″ to 12″, My., wh.
anemonoides, 3″ to 6″, sum., wh., pur.
asiaticus (*see* below).
bulbosus flore pleno, 1′, spr., yel.
cortusæfolius, 3′ to 4′, My., grh., yel. (*syn.* grandifolius).
Ficaria, 6″, Mch., yel. (*syn.* Ficaria ranunculoides). Lesser Celandine, Pilewort.
— alba, wh.
— flore pleno, double yel.
— grandiflora, large flowers.
glacialis, 3″ to 6″, Je., wh.
Lingua, 2′ to 5′, Jy., yel. Greater Spearwort.
— grandiflora, larger.
Lyallii, 2′ to 4′, spr., wh., difficult to grow.
montanus, 6′, My., yel. (*syn.* nivalis).
parnassifolius, 3″ to 6″, Je., wh.
rutæfolius, 3″ to 6″, My., wh., yel.

Other Species and Varieties :—

acris, 8″ to 30″, Ap., yel. Common Buttercup.
— plenus, double. Yellow Bachelor's Buttons.
aquatilis, My., floating aquatic, wh. Water Crowfoot, Ram's Foot, etc.
Buchanani, 6 to 12″, sum., wh.
bulbosus, 1′, spr., yel. Gold Cup, Cuckoo Buds.
bullatus, 1′, My., hlf-hdy., or. yel.
carpaticus, 1′, My., yel.
cassubicus, 6″, Je., yel. (*syn.* flabellifolius).
chærophyllos, 1′, My., yel.
crenatus, 4″, Je., wh.
gramineus, 6″ to 12″, Ap., yel.
illyricus, 1½′, My., yel.
isopyroides (now Callianthemum rutæfolium).
millefoliatus, 1′. My., yel.
— fumariæfolius, yel.
— grandiflorus, larger flowers.
monspeliacus, 1½′, Ap., yel.
pedatus, 1′, My., yel.
polyanthemos, 1′ to 1½′, sum., yel.
— plenus, double.
pyrenæus, 1′, Je., wh.
repens, My., trailing, yel.; a bad weed.
— flore pleno, flowers.
Seguieri, 3″, Je., wh.
Thora, 9″, My., yel.

The FLORISTS' RANUNCULUS.

Description.—Asiaticus naturally is a pretty plant, grows about 9″ high, and has single flowers of various colours, whilst in gardens its value consists in the double varieties which have been raised from seeds, and which were for many years popular florists' flowers. Lately they have been neglected, but many of them are so beautiful that they will again come into favour.

Propagation.—By seeds sown in spring, or by offsets from the tuberous roots.

Soil.—Two parts of loam and one each of leaf soil, sharp sand and well-decayed cow manure. If the natural soil is unsuitable it may be taken out to a

Rantry (*see Pyrus Aucuparia*).

depth of nearly 2′, the fresh soil being allowed to settle before planting.

Planting.—Many florists prefer to plant in the middle of October, giving protection with litter in winter, but unless a good deal of attention can be given it is more prudent to defer the operation until near the end of February. Draw lines about 6″ apart and 2″ deep, and put the tubers in these, claws downwards, filling in with some sand before covering with soil. Watering is necessary in dry weather after the plants appear, but it should be carefully done after the sun is off the beds.

Shading.—In order to have perfect blooms, and to prolong their beauty, an awning may be put over the bed, but this is unnecessary for flowers for ordinary cutting purposes.

Lifting.—The tubers should be lifted when the leaves turn yellow, and stored in a dry, cool place in drawers or paper bags.

Varieties.—For garden decoration and cutting, the large but somewhat coarse French Ranunculuses sold as asiaticus superbissimus are very suitable. The Turban or Turkish and the Persian Ranunculuses are, however, much more refined and beautiful. Those who wish to have the best flowers should purchase some of these and raise others from seed, carefully selecting the best shaped flowers with the finest colours.

Selections :—

Persian. These are of the finest form and colour :—

Bridesmaid, wh.
Carmine, car.
Commodore Napier, lemon, pur. edge.
Cramoisie à Cœur Vert, crim. sc., centre grn.
Fire King, sc.
Jaune Supreme, yel., centre blk.
King of the Netherlands, blk.
Orange Brilliant, yel., centre blk.
Princess Victoria, ro., centre grn.
Queen Victoria, wh., spotted car.
Reine Vasty, lemon, ro.
Sir Wm. Penn, wh., edged cerise.

Turban. Form like that of a Pæony :

Black, dark sc.
Carmine, car.
grandiflora, crim., striped yel.
Hercules, wh.
Merveilleuse, or., flushed yel.
Prince de Galitzin, yel.
Romano, sc.
Séraphique, citron yel.
Souci doré, coffee colour.
viridiflora, grn., sc.

French Ranunculuses :—

These can be had in mixed or separate colours, such as crimson rose, crimson scarlet, orange scarlet, pale primrose, white, and yellow. Named varieties are not much grown.

RAPE. (Brassica Napus.)

The edible-rooted Rape is occasionally seen in gardens. The roots are about ¾″ in diameter, long, and white. Seed should be sown at the end of January on soil which has not been recently manured, otherwise the roots will fork badly, and be nearly useless. The rows may be 1′ apart, the plants 10″ asunder in the rows. The roots from this sowing will be ready in May or early June. Rape is occasionally sown for use as a small salad, when young; and is used for market to the exclusion of Mustard, being cheaper. Rape dust, which has been recommended as a cure for wireworm, is composed of the remains of the seed, dried and powdered, after the expression of the oil. Its value in combating wireworm is probably overrated. (For species, *see* Brassica.)

RAPHANUS.

A small genus (*ord.* Cruciferæ) of hardy, annual or biennial, branching herbs, with white, purplish, or yellow flowers. (For cultivation, *see* Radish.)

Principal Species and Variety :—

sativus, My., ann., wh., vio. By some considered to be a var. of Raphanistrum. Common Garden Radish.
— caudatus, sum., ann., pur. (*syn.* caudatus).

Other Species :—

maritimus, 1½′ to 3′, bien., sum., yel.; British. Sea Radish.
Raphanistrum, 1′ to 2′, sum., ann., wh. to yel.; British. Wild Radish.

RAPHIA (*syn.* Metroxylon of Sprengel).

Stove Palms (*ord.* Palmæ), with large pinnatisect leaves, and bunches of fruits weighing from 200 lb. to 300 lb. Propagation, by imported seeds, sown in bottom heat. Soil, loam three parts, leaf soil one part, and sand.

Principal Species :—

pedunculata, lvs. 50′ to 60′ long, fruits usually pyriform (*syn.* Ruffia). Ruffia or Raffia Palm. It gives that useful garden tying material the Raffia, or Raphia of commerce.
vinifera, trunk 6′ to 8′ high, lvs. 50′ long, nearly erect, spiny (*syn.* tædigera). Bamboo or Wine Palm.

RAPHIOLEPIS (*syn.* Rhapiolepis. Indian Hawthorn).

Hardy or half-hardy evergreen shrubs (*ord.* Rosaceæ). Japonica, though reputed hardy, should be given the shelter of a south wall and covered with mats during severe frost. Propagation, by cuttings of the ripened shoots in sand under a glass in a cold frame. Soil, fibrous loam and peat, with sand.

Principal Species and Varieties :—

indica, 4′ to 8′, sum., hlf-hdy., wh.
— Pheostemon, wh., br. filaments (*syn.* indica of *Botanical Register* 468).
— rubra, red (*syn.* rubra of *Botanical Register* 1400).
— salicifolia, wh. (*syn.* salicifolia of *Botanical Register* 652).
japonica, Je., hdy. shr., wh., fragrant (*syns.* integerrima of gardens, japonica integerrima of *Botanical Magazine* 5510, Mertensii, ovata of gardens not of Briot., and Mespilus Sieboldii).
ovata, spr., pk. wh.; there is a variegated var. Japanese Hawthorn.

RAPHISTEMMA.

Climbing stove shrubs or sub-shrubs (*ord.* Asclepiadeæ) with white, rather large flowers and membranous leaves. Neither of the species is commonly grown, but they answer to the same cultural treatment as the Stephanotises.

Principal Species :—

ciliatum (now Dœmia extensa).
pulchellum, Jy., lvs. heart shaped.

Rapatea (*see Saxofriderica subcordata*).
Rape, Broom (*see Orobanche*).

Raphidophora (*see Rhaphidophora*).
Raphidophyllum (*see Sopubia*).
Raspailia (*see Polypogon*).

RASPBERRY.

Description.—The Raspberry, Rubus Idæus (*ord.* Rosaceæ), likes a deep, rich loam inclining to be heavy. As the plants are heavy feeders it will be well to deeply bastard trench the ground. Good yard dung is suitable for digging into the heavy soils, whilst for those of a lighter character cow dung is good. Work either of these liberally into the lower spits.

Propagation.—By seeds, cuttings, and suckers. Suckers are generally used. They should be carefully detached from the parent stools with plenty of fibrous roots about the end of October or the beginning of November. Speedy planting after lifting is desirable, or the roots will shrivel. Cuttings are rarely employed; only when suckers fail. Seeds are chiefly utilised for obtaining new varieties. They are saved from large, perfectly ripened fruits, the pulp being washed away in clear water. Sown immediately, they germinate by spring, may be transplanted the following autumn, and cut back the next spring, so that they bear fruit the year after, that is in the third year from the date of sowing the seed.

Planting.—Raspberries may be planted from the end of October until the middle of March, but advantage should be taken of fine weather in autumn, as the plants then start better in the spring. The method generally adopted is to plant in clumps about 5′ apart each way for the heavy ground and where two or three plants go to each clump, or 5′ × 3′ where the soil is lighter and the plants are put in singly. The canes in this case are trained to stout poles 6′ high above ground. An excellent method where specially fine fruit is desired is to train the canes to wire trellises about 4′ apart, the stools being 1½′ to 2′ apart in the rows. Raspberry arches are occasionally seen, with the rows about 4′ apart, and good fruit may be obtained thus.

The young plants should have the canes all cut back to within 6″ of the ground, but if planting is done in autumn cutting back should be left until spring. The effect of this is to cause stout canes to be pushed up from the roots, and these canes will bear a good crop the following year. If cutting back is not done the canes thrown up are weak, and it may be several years before the plants yield a good crop.

After-Cultivation.—Pruning consists in leaving from five to eight young canes to a stool to bear the next year's fruit, removing the unripe tips and cutting out the old canes and the weaker and supernumerary young ones. Many cultivators hold it to be an advantage to remove the old fruiting wood soon after the fruit has been gathered. The selected canes may be loosely tied to the stakes with twisted Willows.

It is important that the ground between the stools should never be dug with the spade, for the plants are surface rooters and would suffer. The annual mulching of yard dung in autumn may, however, be lightly forked in, no more. A second dressing in spring will be of service unless the soil is very rich. Liquid manure may be applied liberally during the cropping season. Bone meal may be applied in autumn at the rate of 3 oz. to 5 oz. per square yard. The ashes from the burnt canes are excellent, also wood ashes of any sort.

In good, holding ground a Raspberry plantation will last for many years, but in light media five or six years will find it showing signs of exhaustion, the smaller fruits and weaker canes being unmistakable. It is a matter of ordinary care to have a second plantation coming into bearing before the first is grubbed up.

Varieties, a Selection:—

Two or three varieties are grown in small gardens, rarely more.

Red. Summer Fruiting:—

Baumforth's Seedling.
* Carters' Prolific, canes short and strong; rabbits and hares are very fond of them.
Hornet, tall, fine.
Northumberland Fillbasket, good for strong land and cold districts.
* Superlative, large, rich crim., a hdy., vigorous sort.

Red. Autumn Fruiting:—

Belle de Fontenay.
October Red.

Yellow. Summer Fruiting:—

Yellow Antwerp.

Yellow. Autumn Fruiting:—

October Yellow.

Semper Fidelis, Fastolf, Red Antwerp, and Yellow Antwerp are other fairly well-known vars.

* Select either of these where one variety only can be grown.

Enemies.—The fungoid pests chiefly grow on the dead canes and do not work much harm. The Raspberry Brand (Phragmidium Rubi-Idæi) produces dark coloured, then yellow blotches, and this, together with Coleroa Chætomium of Kunze, causes the untimely fall of the leaves. The remedy is to burn the infested leaves, but such a drastic measure is seldom needed.

Of the insect pests, Otiorhynchus sulcatus, O. tenebricosus, and O. picipes all gnaw the young shoots, often causing their death and the serious depletion of the crops. Searching for the pests by the aid of lantern light is the best remedy. (*See also* OTIORHYNCHUS.)

Anthonomus Rubi, the Raspberry Weevil, lives in and feeds upon the flower buds. Its ravages are more difficult of detection than those of the Otiorhynchuses, for it is the small larvæ which work the mischief, not the beetles directly. The latter appear in July, hybernating near by. The beetles may be caught like the Weevils, and the buds, if badly infested, may be burnt. Syringing with Quassia water is helpful in slight attacks.

The Raspberry Beetle (Byturus tomentosus) is probably the most destructive of all the beetles that favour the Raspberry. The females bore into the flower buds and the larvæ feed upon the fruits. Remedies as for Anthonomus Rubi.

Fenusa Pumilio is the most harmful of the sawflies whose larvæ carry on the work of leaf-miners. Crushing the larvæ in the leaves between finger and thumb in mild attacks, and burning the leaves in the case of bad ones, are the remedies.

Several species of Aphides feed upon the leaves or cause galls. (For treatment, *see* APHIDES, or try one of the washes described under INSECTICIDES.)

The Raspberry Moth or Raspberry-bud Caterpillar (Lampronia rubiella) is common and destructive. The larvæ feed upon the tips of the young shoots and eat their way down the centre, through the pith. These shoots rarely recover. The larvæ are brilliant red with brown heads, and thus, though small, are not difficult to see. They pupate in early summer, and the moths emerge three weeks after. A second brood makes its appearance in the autumn and feeds upon the leaves.

They pupate in the soil close to the plants, and hybernate there. A watch should be kept upon the tips of the young shoots, and hand picking and dustings of soot may be brought into play.

RASPBERRY-BLACKBERRY.

The common Blackberry (Rubus fruticosus) has been crossed with the Raspberry (Rubus Idæus). The hybrid resulting is known as the Raspberry-Blackberry. The growth closely approaches to that of the Blackberry, with faint traces of that of the Raspberry, while the fruit is purple red in colour and intermediate in flavour between that of its parents. It is borne in clusters. Culture as for the Blackberry, which *see*.

RAUWOLFIA.

A genus of forty species of stove shrubs or trees (*ord.* Apocynaceæ). Propagation, by cuttings in heat under a bell-glass in sand. Soil, loam and peat in equal proportions with sharp sand.

Principal Species :—

canescens, 7′, sum., red (*syn.* hirsuta).
— tomentosa, wh. (*syn.* tomentosa).
densiflora, 6′, Je., wh. (*syn.* Tabernæmontana densiflora).
serpentina, 1′ to 2′, My., wh. or pk., fruit red.
ternifolia, 3′, My., wh.

RAVENALA (*syn.* URANIA).

Handsome stove plants (*ord.* Scitamineæ). Propagation, by suckers or by seeds. Rich, loamy soil, with plenty of water when growing. (*See also* MUSA.)

Only Species :—

guianensis, 15′, wh.
madagascariensis, 15′, wh. Travellers' Tree.

RAVENEA.

A graceful stove Palm (*ord.* Palmæ), allied to Hyophorbe, which *see* for cultural details. In appearance it resembles the Chamædoreas.

Only Species :—

Hildebrandtii, 10′, grh., wh., leaflets lanceolate ; best when quite young.

RAVENIA.

Stove or warm greenhouse shrubs (*ord.* Rutaceæ). Both are well worth attention, but are not much grown. Propagation, by cuttings of the half-ripened shoots in sand with bottom heat. Soil, fibrous loam and sandy peat in equal parts.

Principal Species :—

rosea, 2′, sum., rosy red.
spectabilis, 2′, sum., red, sc. (*syn.* Lemonia spectabilis of *Botanical Register* xxvi. 59).

RAVENSARA (*syns.* AGATHOPHYLLUM and EVODIA OF GÆRTNER. MADAGASCAR NUTMEG).

Glabrous stove trees (*ord.* Laurineæ), characterised by strong aromatic properties. Propagation, by cuttings in sand under a bell-glass, with bottom heat. Soil, fibrous loam two parts, peat one part, and sand one-eighth.

Principal Species :—

aromatica, 30′, wh. (*syn.* Agathophyllum aromaticum.

Rat's Tail Cactus (*see Cereus flagelliformis*).
Rattlesnake Fern (*see Botrychium virginianum*).
Raxopitys (*see Cunninghamia*).
Rea (*see Dendroseris*).
Reana (*see Euchlæna*).

REAUMURIA.

Half-hardy shrubs (*ord.* Tamariscineæ). Propagation, by cuttings of the young wood under a bell-glass, in spring. Soil, equal parts of loam and sandy peat.

Principal Species :—

hypericoides, 2′, Aug., hlf-hdy. shr., pur., branches forked, lvs. narrow.

RED CURRANT (*see* CURRANT).

RED-FOOTED BEETLE.

Luperus rufipes is a small, insignificant-looking black beetle with red feet. It attacks Apple and Pear leaves, and is often present in great quantities. It pierces the leaves with innumerable small holes. The beetles make their appearance early in the season, and as they have a comparatively long life they do considerable damage. The female insect lays her eggs in the soil, consequently dressing the soil with lime is recommended. Shaking small trees in spring, a white cloth being spread beneath to catch the beetles that fall, is a capital plan. Spraying with Paris Green, 1 oz. in 20 gallons of water, is efficacious.

RED-LEGGED GARDEN BEETLE.

A popular name for Otiorhynchus tenebricosus. This destructive little insect, also known as the Apricot Weevil, does not confine its attentions to that fruit, but affects Peaches, Nectarines, Plums, and the roots of Raspberries. The beetle is black, with tufts of yellow down. The larvæ live in the soil and attack the roots. Occasionally a plant will collapse, and it is only then that the cause of the mysterious malady is apparent. (*See* RASPBERRY.)

RED SPIDER.

One of the most formidable insect enemies the gardener has to cope with is the Red Spider, Tetranychus telarius. The name is somewhat misleading, as the insect is not a spider but an eight-legged suctorial mite of almost microscopic size. In colour it ranges from rusty brown to brick red. Though not a true spider it spins a fine web on the under surface of the leaves. When a plant is suffering from an attack of this pest the leaves quickly become yellow or yellowish green, mixed with whiter patches. Bad attacks will cause entire defoliation. The spread of the insect is promoted by drought and fire heat. Increase of atmospheric moisture, fumigation, syringing, and dusting with flowers of sulphur are the best remedies.

REEVESIA.

Greenhouse trees (*ord.* Sterculiaceæ). The only species yet introduced is thyrsoidea. Propagation, by cuttings of the ripened shoots, inserted, with all the leaves intact, in sandy soil, in a close frame

Red Admiral Butterfly (*see Vanessa*).
Red Bay (*see Laurus carolinensis and Persea carolinensis*).
Red Cedar (*see Juniperus virginiana*).
Red Gum (*see Eucalyptus resinifera and E. ficifolia*).
Red Mahogany (*see Eucalyptus resinifera*).
Red Puccoon (*see Sanguinaria*).

with bottom heat. Soil, loam two parts, peat one part, and sand.

Principal Species : —

thyrsoidea, 3′ to 4′ under cultivation, Jy., wh. A handsome plant.

REGELIA.

Rigid greenhouse shrubs (*ord.* Myrtaceæ). Propagation, by cuttings of the half-ripened shoots in sandy soil in a close but only gently heated frame Soil, loam, peat, and leaf mould, in equal parts, with sharp sand.

Principal Species :—

ciliata, 3′ to 5′, red, in dense, globular heads.

REHMANNIA.

Hardy or half-hardy perennial herbs (*ord.* Scrophularineæ). The flowers are large and showy, and the plants are easy to grow, but chinensis, though hardy, thrives best in a cool house. Propagation, by cuttings in spring. Any ordinary fertile soil.

Only Species :—

chinensis, 1′ to 2′, Ap., hdy., dull pur. (*syn.* glutinosa).
rupestris, 1′ to 1½′, Jy., hlf-hdy., wh., flushed ro., lvs. hairy.

REINECKIA (*syn.* LIRIOPE of SALISBURY).

A hardy herbaceous perennial (*ord.* Liliaceæ). Propagation, by division in spring. Ordinary garden soil.

Only Species :—

carnea, 1″ to 6″, Ap., fleshpk., fragrant (*syns.* Sansevieria carnea and sessiliflora of *Botanical Magazine* 93).
— variegata, lvs. grn., wh.

REINWARDTIA.

Free-flowering plants (*ord.* Lineæ) that come in admirably for winter decoration. The flowers are fugitive, but strong plants provide a lengthy succession. Propagation, by cuttings in March and April in a close case, in sandy soil, with bottom heat. Ninety per cent. of the cuttings should strike. Soil, fibrous loam two parts, old Mushroom bed manure one part, leaf mould one part, and sand. As soon as the cuttings are rooted they should be potted off singly into small 60's, thence into 48's, and finally flowered in 32's (6″ pots). The plants revel in plenty of heat, and may be plunged in fermenting material all through the growing season. Towards autumn they should be freely exposed to the sun to ripen the growths. Two pinchings are needed during the growing season, to induce a shrubby habit. Treat as stove plants all the summer, and flower in a temperature of 55°; in a cooler house the flowers will not open well. Old plants may be cut back after flowering, and grown on again, but they are rarely as successful as young ones. Red spider and mealy bug are the two most destructive insect pests.

Principal Species :—

tetragyna, aut., win.,shr. yel.
shr., yel. (*syn.* Linum trigynum).
trigyna, 2′ to 3′, Oct.,

Reichardia of Roth. 1787 (*see Picridium*).
Reichardia of Roth, 1800 (*see Maurandia*).
Reichardia of Roth. 1821 (*see Pterolobium*).
Reidia (*see Phyllanthus*).

RELHANIA (*syn.* MICHAUXIA OF NECKER).

Greenhouse shrubs and annual herbs (*ord.* Compositæ) of little garden value. Propagation, by cuttings of the half-ripened shoots in spring, in sandy soil under a bell-glass. Soil, loam three parts, peat one part, sand one-eighth.

Principal Species :—

pungens, sum., grh., yel., a weak-growing shrub.

REMIJIA.

Stove trees and shrubs (*ord.* Rubiaceæ), allied to the Cinchonas, like which they may be propagated. Soil, rough peat. A free supply of water is needed.

Principal Species :—

pedunculata, st. or warm grh. shr., pk., lvs. ovate.

REMUSATIA.

Stove herbs (*ord.* Aroideæ), with tuberous roots. Propagation, by division in spring. Soil, loam, peat, and leaf mould in equal parts, with sand. Free drainage and a liberal water supply are required during the growing season, and a complete rest in winter.

Principal Species :—

vivipara, lvs. grn., heart shaped (*syn.* Caladium viviparum).

RENANTHERA (*syn.* NEPHRANTHERA).

Epiphytal Orchids (*ord.* Orchidaceæ) of curious habit, with long, leafy, branching stems. Coccinea makes an excellent subject for training against a rustic tree stump in the warmest houses. Ash or Tree Fern stumps should be chosen. It requires plenty of sunlight, as well as liberal supplies of moisture at the root. Storiei, although a pretty Orchid, is a bad doer, and is generally more or less of a failure. It does best when potted in sphagnum and crocks and associated with the Phalænopses. Propagation, by cuttings in brisk heat. Soil, lumpy peat, living sphagnum moss, and a few pieces of charcoal with sand.

Principal Species :—

coccinea, 3′ to 7′, st., blood red, strong aërial roots.
— alba, wh.
imschootiana, 6″ to 24″, spr., st., red, yel., resembling coccinea. Superba is a finely marked var. Both are good basket plants.
Lowii (now Arachnanthe Lowii).
Storiei, flowers 2″ across, velvet crim., lip crim., barred yel., very showy but a weak grower.

Other Species :—

elongata, pur. (*syn.* matutina breviflora).
histrionica, yel., lip wh.
hookeriana, aut., lower flowers rich or., spotted blackish pur., upper wh., blotched red.
— rohaniana, yel., crim.
matutina, 1′ to 3′, sum., red disc, turning purplish.
moluccana, red.

RENEALMIA (*syns.* ETHANIUM, GETHYRA, and PEPERIDIUM).

Stove herbaceous perennials (*ord.* Scitamineæ). Few appeal to the gardener, and exaltata is the only one that calls for mention. Propagation, by

Renealmia of R. Brown (*see Libertia*).
Requienia (*see Tephrosia*).

division in spring. Soil, fibrous loam and peat in equal parts, with sand.

Principal Species :—

exaltata, 8′ to 10′, Jy., sc., fruits blk. vio., seeds aromatic (*syn.* Alpinia tubulata of *Botanical Magazine* 2494 and *Botanical Register* 7771).

RESEDA. (Mignonette.)

Hardy annual, biennial, or perennial herbs (*ord.* Resedaceæ). Few of the species are worthy of cultivation, the best being odorata, the Mignonette, which *see*. Propagation, by seeds sown in spring where they are to bloom. Soil, common garden soil with lime rubbish mixed with it.

Principal Species :—

alba, 2′, My., bien., wh.
glauca, 6″, sum., bien. or per., wh.
hybrida grandiflora, 1′, sum., creamy yel., hybrid (odorata × alba).
Luteola, 1′, sum., per., yel. Dyer's Rocket.
odorata, 1′, per., yel., wh. Mignonette.
— frutescens.

RESERVE GARDEN.

In well-appointed gardens a piece of ground is set apart as a nursery from which to draw supplies as needed to replenish exhausted plants elsewhere, to fill up blanks, or to increase and vary the display in other parts of the garden. The reserve garden is the helpmate of the propagating pits and cold frames, which perform similar offices for the tender plants or help half-hardy plants through their delicate stages. In gardens where quantities of cut flowers are wanted it is necessary, in the interests of the flower beds and borders, that cut flowers should be obtained elsewhere. There need be no attempt at artistic arrangement. It is better that each subject shall be planted in breaks by itself.

Material that is to be forced for winter flowering usually bulks largely. Bulbs, etc., of all kinds that have been forced may be planted out, unless there is room for them in the grounds, and they will throw useful batches of flowers for several years, although they will not do to force again. Young shrubs, necessary for the filling of window boxes, etc., in the winter, are placed in the reserve garden after they have done duty. For this class of stuff, at least, the reserve garden is the intermediate stage between the propagating ground—nursery—and the "show" quarters.

Some part of the reserve garden will contain a number of pot plants, which should always be plunged in winter to prevent frost "chipping" the pots. Lilacs, Roses, Deutzias, Prunuses, Viburnums, Moutan Pæonies, Staphyleas, and Wistarias are a few instances. Tree Ivies in pots, and reserve boxes of climbing Ivies trained to wire trellises for window decoration, will likewise find a place.

Where rabbits are numerous it is advisable to have a stock of bedding plants in pots ready to make good the ravages committed.

It is imperative that plenty of water should be laid on in the reserve garden. Breaks of plants of all kinds "lift" much better if given a good soaking about twenty-four hours beforehand, in the summer.

REST and RESTING.

Plants require periods of rest, and unless these are granted the results are unsatisfactory. The regular recurrence of darkness brings something in the nature of rest, although the word carries with it a rather different meaning from the rest which night brings to animals. Some functions of the plant's organism, notably transpiration and assimilation of carbon-dioxide, cease with the passing of light. Certain phases of growth are more active by day, but, as a rule, the rate of increase in height is greater by night than by day. The whole process is too subtle and complex to be described here in detail, but it may be stated that alternate periods of light and darkness are as necessary to the plant as to the animal.

When the gardener speaks of resting a plant he refers to a period of comparative dormancy which comes to hardy subjects with the fall of the leaf. Rest in this case is coincident with winter. Whether the plant be a hardy or an exotic one, it must have a rest. Therefore in dealing with plants under glass the cultivator strives to give this rest when nature shows signs of lessening vigour. This time comes when—as, for instance, with many bulbous plants and the majority of Orchids—the season's growth has been finished. The rest may be partial or complete. Thus a Hyacinth needs a complete rest, a Crinum and a Vallota only a very partial one. Most Dendrobiums enjoy a complete cessation from activity, whilst most Odontoglossums have to be kept growing the whole year round, although even they too have their period of comparative inactivity. Stove shrubs and Ferns are growing more or less all the year round; still, they enjoy a little relaxation of the stimulus of high cultivation during the winter months.

The physical conditions necessary to promote the healthy rest of plants may be briefly stated thus:

(1) A lower temperature than that given when growth is active.
(2) A greatly decreased water supply. In cases of complete rest none is given, but where pseudo-bulbous and semi-evergreen subjects are concerned just enough is given to prevent shrivelling.
(3) No manurial stimulants of any kind.
(4) A drier atmosphere.

As a rule, it is convenient to rest many plants coincidentally with the winter season, but this cannot be done where the plant has a strong inclination to flower at that time, like the Hellebore.

The eye of the cultivator must be upon the watch for the signs that the plant wishes to commence growth. It is inadvisable to arbitrarily keep a plant resting when its buds begin to swell. Water must be given, and a greater degree of heat. With some subjects, notably the Cyclamen, the cultivator has the choice of resting his plants during the summer, and of keeping them growing the whole time.

RESTIO (*syns.* Craspedolepis, Ischyrolepis, Megalotheca, and Rhodocoma. Rope Grass).

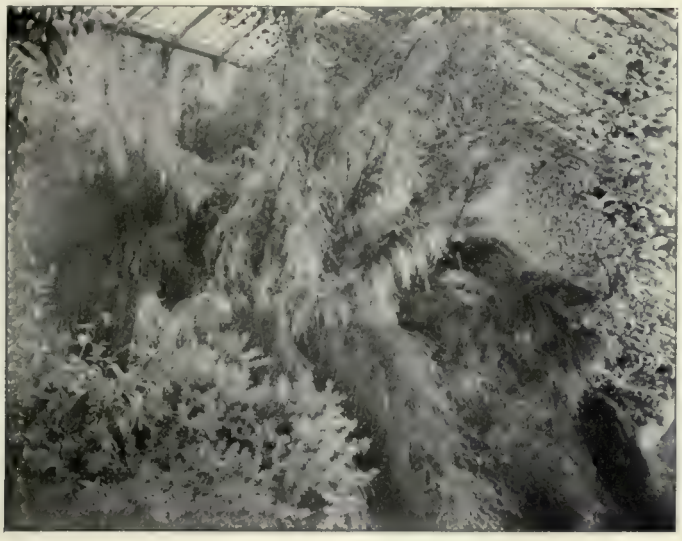
Several of the many species of Restio (*ord.* Restiaceæ) have been introduced at various times, but none is of great horticultural interest, and it is probable that none of them save sub-verticillatus

Rest Harrow (*see Ononis*).

(*see* figure) is cultivated even in botanic gardens. It needs a warm greenhouse temperature.

RESTREPIA.

Cool house Orchids (*ord.* Orchidaceæ), with tufted stems and creeping branches. In habit the Pleurothallises and the Restrepias can scarcely be distinguished from each other. Propagation, by division and imported pieces. Soil, living sphagnum and lumpy, fibrous peat, with free drainage. Shallow pans or baskets suspended from the roof suit most of the species well.



Restio sub-verticillatus.

Principal Species :—

[Note.—s. = sepals, p. = petals, l. = lip.]

dayana, 5″ to 8″, sum., s. and p. br., yel., yel., pur.

ecuadorensis, 4″ to 6″, sum., s. and p. wh., yel., pur , l. maroon, yel.

elegans, 4″ to 6″, sum., upper s. and p. wh., pur., lower s. and l. yel., dotted pur.

maculata, 4′ to 6″, s. and p. yel., red, l. small (*syn.* antennifera).

ophiocephala, wh., pk., solitary, 1″ across (*syn.* Pleurothallis ophiocephala. Purpurea is a var.

pandurata, 3″ to 5″, lvs. pur beneath, flowers smaller than in maculata, wh., pur.

reichenbachiana, 2″ to 3″, sum., yel., s. tipped pur.

sanguinea, 2″ to 5″, win. crim., yel.

— gemma, 2″ to 5″, 2″ across vertically, sum., wh., crim., pur., yel., l. small.

striata, 3″ to 6″, upper s. and p. maroon, lower s. and l. maroon, striped yel.

RETARDING.

Retardation is the prolongation of the resting period. This is only possible where the plants are kept in a temperature lower than is required by the plant to make new growth. It is obvious that it is only hardy subjects which are used to low temperatures in the winter, that can be thus treated. A temperature about the freezing point is needed. Lilies of the Valley, Liliums, Spiræas, and Azalea mollis are a few subjects that can be thus treated successfully, and it is practically certain that there are many others.

A long suspension of growth is weakening, but periods of under a year appear to have little appreciable ill effects. Retarded Lily of the Valley crowns start more quickly than those which have not been retarded, and the flowers are fully as fine. Retarded plants can be had at reasonable prices.

It is possible to have certain flowers practically at all seasons of the year.

It is often necessary to delay the blooming of plants for several days, or even weeks, so as to ensure a display upon a certain date. Much can be done by placing these plants in houses with a north aspect, or under the shelter of a north wall.

Flowers which are fugacious when the plants are in hothouses have their lives lengthened if placed in cool and sunless surroundings after expansion.

RETINIA.

Small moths of the group Stigmonotidæ, several species of which are destructive to Conifers. They vary from ½″ to 1″ in spread of forewings. Although turionana has been given the name of Pine Bud Moth because the larvæ eat into the buds and tips of the shoots, the species duplana, occultana, resinana, buoliana, and pinicolana equally deserve it. The shoots are hollowed out, and either die or become distorted, gouty specimens. Resinana is also known as the Resin Gall Moth, because a gall of resin is formed about each larva. Destruction by fire of all infected shoots is the only remedy.

RETINIPHYLLUM (*syn.* Commianthus).

Stove shrubs (*ord.* Rubiaceæ), with showy flowers and edible berries. Propagation, by cuttings of

Resurrection Plants (see Anastatica Hierochuntina, Mesembryanthemum Tripolium, and Selaginella lepidophylla).

semi-matured shoots, in sand, on a hotbed. Soil, fibrous loam and peat in equal parts, with sand.

Principal Species :—

secundiflorum, 4′, Jy., st., wh., in clusters.

RETINISPORA (*syn.* RETINOSPORA).

The Retinisporas belong to the genus Cupressus, which *see*. They have long been favourites in gardens for their elegant habit, however, and the name Retinispora will not soon be lost sight of. The plants are of slower growth than the majority of Conifers, and thus come in very usefully for the trimly kept grounds near the dwelling house. They are also great favourites for cemetery adornment; in fact, there are no subjects better suited for this class of work. When growing in sheltered positions they remain feathered to the base until the last. Propagation, as for the Cypresses generally, is by seeds, and by cuttings in October. The latter root freely. Descriptions of species will be found under CUPRESSUS.

RHAMNUS. (BUCKTHORN.)

Description.—Few of the sixty species (*ord.* Rhamneæ) are of great decorative value. Frangula and catharticus have been planted to a considerable extent at various times for cover for game, and even now they are frequently included in shrubberies for the sake of their shining black berries. In the autumn libanoticus is conspicuous by reason of its richly hued foliage. Several dyes are afforded, and some fruits have purgative qualities. The wood of Frangula is employed in the manufacture of gunpowder.

Propagation.—All the hardy species by seeds and layers; the stove and greenhouse forms by cuttings.

Soil.—Any fairly fertile garden soil will do.

Principal Species and Varieties :—

Alaternus, 20′, Ap., Je., hdy., grn.
— angustifolius, narrower lvs. (*syns.* angustifolius, Clusii, and utilis of gardens, not Decaisne).
— angustifolius variegatus, lvs. margined silvery wh.
— aureus, lvs. dotted yel.
californicus, 6′ to 12′, My., hdy. ev., grn. (*syns.* intermedius, laurifolius, oleifolius, pedunculatus, and Frangula californica).
catharticus, 5′ to 10′, sum., hdy., grn., fruits blk.; Britain (*syns.* infectorius and Wicklius of gardens).
davuricus, 15′ to 20′, My., hdy., grn., yel., branches spiny (*syns.* bapticus, utilis, and virgatus). Hirsutus is a var.
Frangula, 5′ to 10′, sum., hdy., grn., wh., fruits blk. (*syn.* latifolius of gardens, not L'Heritier). Asplenifolius, angustifolius, and aureovariegatus are vars. Berry-bearing Alder, Black Dogwood.
libanoticus, 6′, My., hdy., yel. (*syns.* castaneifolia grandifolia and Imeritiæ of gardens).

Other Species and Hybrids :—

alnifolius, 2′ to 4′, sum., hdy., grn., fruits blk. (*syn.* franguloides).
alpinus, 4′, sum., hdy., grn., fruits blk. Grandifolius is a var.
croceus, 4′, My., hdy. ev., grn., fruits grn. or yel.
hybridus, sterile, lvs. persistent till second win., a supposed hybrid (Alaternus × alpinus; *syns* sempervirens and subsempervirens of gardens).
purshianus, 10′ to 20′, My., hdy., grn., fruits blk., relatively large (*syns.* rubra and Frangula purshiana).

RHAPHIDOPHORA.

Climbing stove shrubs (*ord.* Aroideæ), with long branches which root as they touch the ground. They may be allowed to ramble over a dead tree stem or to fasten themselves against a wall, and have a decidedly elegant appearance. Propagation, by seeds, and by cuttings in sandy peat and loam under a bell-glass, with bottom heat. Soil, fibrous loam and sandy peat, with a few pieces of charcoal.

Principal Species :—

[NOTE.—s. = spathe, sp. = spadix.]

decursiva, s. yel., sp. greyish grn., long and thick.
lancifolia, lvs. lance shaped, 10″ long, s. Apricot, spotted grn., sp. wh.
Peepla, s. yel., reddish yel., sp. yel.
pertusa, lvs. heart shaped.
pinnata (now Epipremnum mirabile).

RHAPHITHAMNUS.

Greenhouse trees (*ord.* Verbenaceæ). Cyanocarpus, 3′ to 20′, blue, lilac berries, is hardy in the south of England. Propagation, by cuttings. Soil, light loam.

RHAPIS.

Distinct-looking Palms (*ord.* Palmæ), with leafy, Reed-like stems and fan shaped leaves. Several take kindly to cool house culture. Flabelliformis is good for use in draughty corridors. The variegated form is more effective, and also more tender. Propagation, by imported seeds, and suckers. Soil, good loam three parts, leaf mould one part, and sand. (*See also* PALMS.)

Principal Species and Variety :—

flabelliformis, 3′ to 8, five to seven spiny leaflets (*syns.* aspera and Kwanwortsik). Ground Rattan Cane.
— foliis variegatis, lvs. striped wh.
humilis, dwarfer (*syn* Sirotsik of gardens).

Other Species :—

cochinchinensis, stem 8′, lvs. fan shaped, petioles prickly

RHAZYA.

Two species of hardy shrubs or sub-shrubs (*ord.* Apocynaceæ), allied to the Vincas. Propagation, by seeds and division. Soil, sandy loam.

Principal Species :—

orientalis, sum., bl., vio. lvs. lance shaped.

RHEEDIA.

An obscure genus (*ord.* Guttiferæ) of stove trees, with small flowers and leathery leaves, of no decorative value.

RHEUM. (RHUBARB.)

Description.—Apart from the common Rhubarbs, forms of Rhaponticum and undulatum, there are several other Rheums (*ord.* Polygonaceæ) serviceable on account of their products. Thus, the Rhubarb or Turkey Rhubarb of medicine is obtained from palmatum, officinale, and Rhaponticum. Rheums may be also made of service in the garden or grounds, where the massive and ornamental leaves and tall spikes of bloom might be more largely employed.

Propagation.—By seeds, sown in spring, or by division in spring or in autumn.

Rhaphidophyllum (*see Rhapidophyllum*).
Rhaphiodon (*see Hyptis*).
Rhaphiolepis (*see Raphiolepis*).
Rhaphidospora (*see Justicia*).
Rhaponticum (*see Centaurea*).

Soil.—Rich loam, with abundance of manure and water. The soil should be deeply trenched, and manure added as the work proceeds. Supplies of manure water in summer are beneficial. (*See also* RHUBARB.)

Principal Species, Varieties, and Hybrid :—

[NOTE.—All are hardy except Ribes.]

acuminatum, 3′, sum., pur. or blood red.
australe, 6′ to 9′, sum., pur., grn. (probably a form of Emodi).
collinianum, 5′ to 6′, Je., crim.
compactum, 5′, My., grn., wh. (*syn.* nutans).
Emodi, 6′ to 10′, sum., whitish.
hybridum Florentini, 6′ to 9′ (collinianum × officinale).
moorcroftianum, 2′, sum., red.
nobile, 3′ to 5′, sum., yel., grn.
officinale, 8′ to 10′, sum., grn.
palmatum, 5′, sum., grn.
— purpureum, pur. crim.
— tanghuticum, lvs. deeply lobed.
Rhaponticum, 4′, sum., whitish. Common Rhubarb.
Ribes, sum., tender, wh., grn.
undulatum, 5′, sum., cream.

RHEXIA.

Erect herbs and sub-shrubs (*ord.* Melastomaceæ). Two are showy hardy herbaceous plants that are well worth a place in all gardens. Propagation, by division. Soil, peat, or one containing a good deal of leaf mould. Several species are now referred to Tibouchina.

Principal Species :—

ciliosa, 1′ to 1½′, sum., hdy. herbaceous, pur.
mariana, 1′ to 2′, sum., herbaceous, pur. Several vars.
virginica, 6″ to 12″, sum., hdy. herbaceous, pur. Deer Grass, Meadow Beauty.

RHINACANTHUS.

Loosely branching, occasionally semi-scandent shrubs (*ord.* Acanthaceæ), of little garden value.

RHINANTHUS (*syn.* ALECTOROLOPHUS).

Upright, hardy annuals (*ord.* Scrophularineæ), of no special garden value. They are more or less parasitic on the roots of Grasses in damp pastures. Propagation, by seed. Any moist soil will do.

Principal Species :—

Crista-galli, 6″ to 18″, sum., yel.; British. Penny Grass, Yellow Rattle.

RHIPOGONUM.

Greenhouse, evergreen climbers (*ord.* Liliaceæ). Propagation, by cuttings of side growths in late spring, beneath a bell-glass, over mild heat. Soil, fibrous loam, peat, and plenty of sharp sand.

Principal Species :—

album, 3′, Je., wh.
scandens, 2′, Je., wh. (*syn.* parviflorum).

RHIPSALIS. (MISTLETOE CACTUS.)

Curious succulent shrubs (*ord.* Cacteæ), whose nearly leafless stems assume various shapes. The flowers of several species are showy. The fruit is much like that of the Mistletoe. Propagation, by cuttings, dried in the sun for a few days before being inserted in sandy or gravelly loam, to root. Soil, sandy loam two parts, and leaf mould and brick rubbish one part each. Sarmentacea does well in fibrous peat or on a block of Tree Fern stem. (*See also* CACTEÆ.)

Principal Species :—

[NOTE.—b. = berries.]

Cassytha, 1′, Sep., slender, grn., wh., b. wh.
crispata, 1′, Dec., wh., minute, b. wh., globose.
funalis, 2′ to 3′, spr., wh., numerous (*syn.* grandiflora).
Houlletii, yel.
mesembryanthoides, spr., wh., b. wh.
Myosurus, Jy., yel., red (*syn.* Lepismium Myosurus).
pachyptera, 1′ to 2′, Nov., yel., grn. (*syn.* Cactus alatus of *Botanical Magazine* 2820).
Saglionis, 8″ to 10″, grn., yel., nearly erect (*syn.* brachiata).
salicornoides, spr., yel., terminal.
— stricta, more compact.
sarmentacea, wh. Good for a basket or block of Fern stump.
swartziana, 1′ to 2′, Je., wh., small.

RHIZOGLYPHUS.

A species of Rhizoglyphus causes much damage to Eucharises, and is known to gardeners as the Bulb Mite. It also attacks Snowdrops, and numbers of other Amaryllidaceous plants. Yellowing foliage and premature death are the signs of infestation (*see* EUCHARIS). Badly infested Snowdrops are best burnt out of hand.

RHIZOPHORA. (MANGROVE.)

Tropical sub-aquatic trees (*ord.* Rhizophoreæ). The interest attaching to them is very considerable. They are to be found on sea shores, mud banks, and swamps, and frequently form impenetrable fringes. The seeds germinate upon the parent plants, and fall when they are furnished with roots and have attained to considerable size. The Mangrove is of the highest importance, as it assists to reclaim land from the sea. The network of roots and stems catches and holds vast quantities of vegetable matter, which ultimately becomes more or less solid ground. The fruit of Mangle, the chief species, is edible, and by fermenting it a kind of wine is obtained.

RHODAMNIA (*syn.* MONOXORA).

Stove or greenhouse shrubs (*ord.* Myrtaceæ), with opposite flowers and broadly lanceolate leaves. Of no special garden value.

RHODANTHE.

Charming greenhouse or half-hardy annuals (*ord.* Compositæ). The cultural conditions are simple. Seeds may be sown in spring and onwards for succession. They may be sown in a pan and the seedlings transplanted, or in a 5″ pot and the seedlings thinned to 2″ apart. The young plants will need supporting by stakes round the outside, and two or three circling bands. Green fly is very fond of Rhodanthes, and must be kept down, or the plants will be badly crippled. Except for this there is no trouble in their culture.

Principal Species :—

Manglesii, 1½′, Je., ro., yel. (now Helipterum Manglesii).

Rhinactina (*see Jungia*).
Rhinoglossum (*see Rhynchoglossum*).
Rhinopetalum (*see Fritillaria*).
Rhipidopteris (*see Acrostichum*).

Rhizomorpha (*see Vine Enemies*).
Rhizopus (*see Lilium Diseases*).
Rhoddon (*see Pyrus Aucuparia*).
Rhodiola (*see Sedum*).

RHODOCHITON.

Volubile, the only species (*ord.* Scrophularineæ), is a very handsome greenhouse climber. Propagation, by cuttings, in late summer, in sandy soil, beneath a bell-glass; also by seeds sown in heat in spring. Soil, good loam, with some leaf mould and sand, over efficient drainage.

Only Species:—

volubile, 10′, Je., calyx pale red, corolla dark crim. (*syns.* Lophospermum atrosanguineum and L. Rhodochiton).

RHODODENDRON.

Description.—Amongst hardy, late spring and early summer flowering, evergreen shrubs the Rhododendron (*ord.* Ericaceæ) has no rival; the flowers, borne in great trusses, have a superb beauty; while when the blooming period is passed the handsome leafage makes the plants quite indispensable. There are, too, many species that are valuable for the greenhouse and the stove. The hybrids include hardy and tender plants, whose exclusion from the garden leaves a wide gap which no other plants can fill. (*See also* AZALEA.)

RHODODENDRONS AT HOWTH CASTLE, NEAR DUBLIN.

Propagation.—By cuttings, grafting, layers, or seeds, in cold frames or in heat according to the constitution of the species, hybrid, or variety. Very sandy peat should be employed in all cases.

Soil.—A deep, fibrous, sandy peat. They will, however, grow splendidly in deep, fibrous loam, and also in clayey loam with plenty of grit, provided lime be not present. In any form lime in the ground will spell disaster to all except hirsutum.

Himalayan Rhododendrons.—Where space can be provided in a winter garden or cool conservatory these magnificent plants amply repay care. Planted out in peaty soil, or grown in tubs or pots, they need abundance of water at most seasons of the year, but at no time do they like any artificial heat—indeed they are quite hardy, and only require protection in the spring, otherwise the beauty of the flowers is destroyed, as their bloom is displayed very early.

Javanese Rhododendrons.—Under this heading all species, hybrids, and varieties needing intermediate house or cool stove treatment may be considered. They include the javanico-jasminiflorum hybrids, and the newer race of multicolor hybrids. The temperature for these should not fall below 55° at night. Encourage growth by syringing freely. Shade lightly in bright summer weather, and at all seasons maintain a moist atmosphere. Members of this section are indicated in the following lists by st.

Deciduous Species.—Several very beautiful Rhododendrons are deciduous, and the two most popular, flavum and sinense, are more particularly referred to in this work under their better known garden titles of Azalea pontica and A. mollis. In addition to these, the deciduous section includes arborescens, calendulaceum, dauricum, nudiflorum, rhombicum, Vaseyi, and viscorum.

Azalea Group.—In modern botany the genus Azalea is not kept up, but forms a group or section of the genus Rhododendron. The cultural remarks made under Azalea and the selection of garden varieties hold good, but those who wish to follow modern botanical nomenclature may substitute Rhododendron indicum var. amœnum for A. amœna, R. calendulaceum for A. calendulacea, R.

RHODODENDRON MINERVA, A BEAUTIFUL GREENHOUSE VARIETY.

indicum for A. indica, R. sinense for A. mollis (R. molle, A. japonica, A. mollis, and A. sinensis are all *syns.* of R. sinense), R. nudiflorum for A. nudiflora, R. flavum for A. pontica, R. speciosum for A. speciosa, and R. viscosum for A. viscosa.

Principal Hardy or Half-hardy Species and Varieties :—

arboreum, 20′ to 30′, spr., wh., ro., red; flowers early and needs protection from late frosts except in warm localities. Numerous vars., the best being album, Campbelliæ, limbatum, puniceum, and roseum.
barbatum, 6′ to 30′, spr., blood red, hlf-hdy.
calendulaceum, 2′ to 6′, My., Je., hdy., yellowish red, or. (*syn.* Azalea calendulacea); there are several garden vars.
campanulatum, 4′ to 10′, Ap., hdy., lil., spotted ro. or pur. Two distinct vars. are pictum and Wallichii (*syn.* Batemanni).
catawbiense, 6′ to 12′, Jy., hdy., lil. pur.
caucasicum, 1′, Aug., hdy., pur.
collettianum, 10′, My., hdy., wh.
dauricum, 3, Jan. to Mch., hdy., rosy pur.; early, well worth grh.
ferrugineum, 1½′ to 5′, Je., hdy., sc.; album, atrococcineum, erectum, myrtifolium, and variegatum are distinct vars. Alpen Rose.
flavum, 4′ to 6′, Je., hdy., yel. (For numerous garden vars. *see* Azalea; *syn.* Azalea pontica.)
Fortunei, 12′, My., hdy., ro.
maximum, 6′ to 20′, Jy., hdy., pale ro. (*syns.* Purshii and purpureum).
— album, wh.
niveum, 15′, Jy., hlf-hdy. except in southern counties, lil., pur. at base inside.
— fulvum, pur.
ponticum, 6′ to 15′, My., hdy., pur., variable in leaf and colour of flowers; garden vars. are very numerous.
racemosum, 1′ to 3′, Ap., hdy., wh., flushed rosy pk.
rhombicum, 2′ to 3′, Ap., hdy., rosy lil.
rubiginosum, 2′ to 3′, spr., hdy., rosy lil.
Schlippenbachii, 2½′, sum., rosy lil.
sinense, 3′ to 5′, Je., hdy., various, wh. to or. (*syns.* molle, Azalea japonica, A. mollis, and A. sinensis). For garden vars., *see* Azalea.
Thomsoni, 6′ to 15′, My., hlf-hdy., deep red.
Vaseyi, 1′ to 2′, spr., hdy., pk.
— album, wh.
yunnanense, 2′ to 3′, Apr., My., hdy., wh., spotted crim.

Principal Hardy or Half-hardy Hybrids :—

altaclerense, 12′, spr., hdy., sc. (arboreum × catawbiense).
Cunninghamii, 12′, spr., hlf-hdy., ro. (maximum × arboreum).
Grievei, spr., hlf-hdy. (ciliatum × glaucum), wh., flushed ro. (*see* p. 273).
kewense, 10′, spr., hdy., blush (griffithianum × Hookeri).
Luscombei, 8′, spr., hdy., red (Fortunei × Thomsoni).
— splendens, crim.
Manglesii, 10′, spr., hdy., wh. spotted br. (Griffithianum × album elegans).
nobleanum, 3′ to 10′, Nov. to Mch., deep ro., red (arboreum × caucasicum); protect when in flower (*syn.* caucasicum var. nobleanum).
præcox, 4′, Mch., light pur. (ciliatum × dauricum); very early, best grown in a cool house.
Rosy Bell, 3′, spr., hdy., rosy lil. (Fortunei × præcox).
Shilsoni, 10′ to 20′, Je., hlf-hdy., red (barbatum × Thomsoni).
Smithii-aureum, 2′, My., yel., ev. (seedling × sinense).
Wilsoni, 2½′, spr., hdy., ro. (ciliatum × glaucum).

Selection of Hardy Garden Varieties :—

A. B. Freeman Mitford, bright crim.
Baroness Schröder, wh., spotted pur.
Baron Schröder, plum, yel. centre.
Caractacus, purplish crim.
Charles S. Sargent, sc.
Doncaster, rich sc.
Duchess of Bedford, crim., light centre.
George Paul, crim., deeper spots.
Gomer Waterer, crim.
Helene Schiffner, wh.
Helen Waterer, wh., margined crim.
Henrietta Sargent, pk.
H. W. Sargent, deep crim.
John Waterer, vivid crim.
Kate Waterer, rosy crim., yel. marks.
Lady Clementina Mitford, peach.
Lady Eleanor Cathcart, ro., chocolate spots.
Marchioness of Lansdowne, ro., blk. spots.
Martin Hope Sutton, sc., deep marks.
Maxwell T. Masters, deep rosy crim.
Memoir, wh.
Meteor, crim. sc.
Michael Waterer, bright rosy sc.
Mont Blanc, dwarf, pure wh.
Mrs. John Clutton, finest of whites.
Mrs. T. Agnew, wh., lemon yel.
Old Port, deep plum pur.
Pink Pearl, large, pk.
Princess William of Wurtemburg, whitish pk.
Sappho, wh., marked maroon.
Sefton, maroon crim.
Sigismund Rucker, magenta crim.
Snowflake, wh.
The Queen, blush.
The Warrior, large, rosy sc., late.
Vandyke, rosy crim.
W. E. Gladstone, fine, rosy crim.

Principal Tender Species and Varieties :—

brookianum, 4′, spr., sum., st., or. yel.
ciliicalyx, 4′ to 6′, Apr., grh., wh., sweet.
Dalhousiæ, 6′ to 8′, spr., sum., grh., yel. tinged grn., almost wh. with age.
Edgeworthii, 3′ to 10′, Je., grh., wh., tinged yel., very fragrant.
Falconeri, 10′ to 30′, My., grh., wh. or yel.; eximium is a fine var.
formosum, 4′ to 8′, Ap., grh., wh., shaded ro., fragrant.
grande, 10′ to 30′, spr., grh., wh. (*syns.* argenteum and longifolium).
griffithianum, 4′ to 8′, My., grh., wh., shaded yel. and ro. (*syn.* Aucklandii).
Hodgsonii, 12′ to 20′, Je., grh., pale pur.
Hookeri, 14′, Ap., grh., red.
jasminiflorum, 3′, sum., st., whitish pk.; carminatum and roseum are pretty vars.
javanicum, 4′, sum., aut., st., or.
kingianum, 10′ to 15′, Ap., blood red.
Maddeni, 6′ to 15′, sum., aut., grh., wh., blush; good vars. are calophyllum and Jenkinsii.
multicolor, 2′, aut., win., st., dull yel.
— Curtisii, ruby crim.
Nuttallii, 10′ to 30′, My., grh., sulphur or buff.
veitchianum, 3′ to 6′, spr., sum., grh., wh., fragrant.
Wightii, 6′ to 14′, Je., grh., straw yel., stained crim.

Principal Tender Hybrids :—

balsaminæflorum, 4′, st., various (javanicum × jasminiflorum). This title applies to a small group of double-flowered vars. raised by selection from the above cross; the vars. are album, wh.; aureum, yel.; carneum, flesh; Rajah, fawn, ro.; and roseum, rosy pk., shaded or.
Ceres, 4′, st., various, yel. (javanicum × Teysmannii).
forsterianum, 4′, spr., grh., wh., fragrant (veitchianum × Edgeworthii).
Hippolyta, 3′, Je., st., bright car. (Teysmannii × multicolor Curtisii).
La Belle, 2′, spr., grh., whitish yel. (ciliatum × forsterianum).
Purity, 3′, st., wh. (Teysmannii × Taylori).
Ruby, 2′, win., st., coral red, shaded crim. (jasminiflorum carminatum × multicolor Curtisii).
sesterianum, 2½′, sum., grh., wh., blush, fragrant (ciliatum × Edgeworthii).
superbissimum, 6′, spr., grh., wh., fragrant (forsterianum × arboreum).
Taylori, 4′, st., pk., wh. tube (jasminiflorum × javanicum).

Selection of Intermediate House Varieties :—

Amabile, flesh ro.
Baroness Schröder, wh.
Cloth of Gold, golden yel.
Diadem, or. sc., car.
Duchess of Connaught, vermilion red.
Hercules, fawn yel., rosy pk.
King Edward VII., yel.
Lord Wolseley, or. yel., ro.
luteopurpureum, ro., wh., yel.
Maiden's Blush, wh., shaded ro.
Minerva, yel., rosy pk.
Monarch, buff, or.
Mrs. Heal, wh. (multicolor section).
Neptune, bright sc. (multicolor section).
Ne Plus Ultra, crim. sc.
Niobe, pale yel.
Ophelia, ro., shaded yel.
President, yel., ro.
Princess Beatrice, yel., pk.
Princess Christian.
Scarlet Crown, vivid or. sc.
Souv. de J. H. Mangles, or. yel., shaded ro.
Triumphans, crim. sc.
Yellow Perfection, vivid yel.

Selection of Cool Greenhouse Varieties :—

calophyllum, 5′ to 10′, wh. (*see* Maddeni var.).
Countess of Derby, wh., very sweet.
Countess of Haddington, blush pk.
Countess of Sefton, wh., pur.
Duchess of Buccleuch, wh., shaded lemon.
Duchess of Edinburgh, or., crim.
Lady Alice Fitzwilliam, pure wh.
Princess Alexandra, blush wh.
Princess Alice, wh., pk.
Princess Royal, pk.

Other Species, Hybrids, and Varieties :—

albiflorum, 2′, Je., hdy., wh.
album, 1′, win., st., grh., wh.
Anthopogon, 2′, My., hdy., yel.
arborescens, 10′ to 15′, Je., red.
argenteum (*see* grande).
Aucklandii (*see* griffithianum).
Batemanni (*see* campanulatum var.).
blandfordiæflorum (*see* cinnabarinum).
blandianum, 12′, spr., hdy., crim.; hybrid.
Boothii, 6′, Jy., grh., yel.
californicum, 8′, Je., hdy., rosy pur. spotted yel.
camelliæflorum, 6′, Ap., grh., wh.
campylocarpum, 3′ to 4′, Ap., hdy., yel.
Chamæcistus (now Rhodothamnus Chamæcistus).
Championæ, 8′, Ap., grh., wh., shaded pk.
ciliatum, 2′, My., rosy pur.
cinnabarinum, 4′, Ap., hlf-hdy., red (*syns.* blandfordiæflorum and Roylei).
Curtisii (*see* multicolor var.).
decorum, 8′ to 10′, My., grh., blush.
Dennisoni, 6′, spr., grh., whitish yel.; hybrid.
eximium (*see* Falconeri var.).
exoniense, 6′, spr., grh., whitish crim.; hybrid.
Farreræ, 3′, Mch., hdy., lil. ro.
Fordii, 1½′, sum., hlf-hdy., wh., shaded pk.
fulgens, 4′, to 10″, Je., hdy.
glaucum (Hook), 2′, My., hdy., pk.
gracile, 6′, sum., st., red.
graveolens, spr., hlf-hdy., wh. (formosum × sesterianum).
Harrisii, grh. (Thomsonii × arboreum).
hirsutum, 1½′ to 2′, My., red.
Jenkinsii (*see* Maddeni var.).
Kendrickii, 10′, spr., grh., sc.
Keysii, 4′, sum., grh., or., sc.
lapponicum, 8″, Jy., hdy., vio. pur.
lepidotum, 3′, Je., hdy., yel. or pur
longifolium (*see* grande).
MacNabii, 3′, spr., grh., blush wh.; hybrid.
malayanum, 6′, sum., st., sc.
Metternichii, 2′, spr., hdy., ro.
nudiflorum, 3′ to 4′, Je., yel., wh., pk., or. (*syn.* Azalea nudiflora); many garden vars. and hybrids.
pendulum, 4′, spr., grh., wh.
punctatum, 4′, Jy., hdy., pk.
purpureum (*see* maximum).
Purshii (*see* maximum).
retusum, 2′ to 4′, sum., st., sc.
Roylei (*see* cinnabarinum).
Shepherdii, 6′, spr., grh., sc.
Smirnowi, 2′ to 3′, spr., hdy., crim.
Ungernii, 2′, spr., hdy., wh.
virgatum, 1½′, Ap., pk.
viscosum, 2′ to 4′, sum., wh., sweet (*syn.* Azalea viscosa); several garden vars.
Williamsii, spr., grh., wh.

RHODOLEIA.

Evergreen greenhouse shrubs (*ord.* Hamamelideæ). Propagation, by cuttings. Soil, sound turfy loam and fibrous, sandy peat.

Principal Species :—

Championi, 8′, Feb., rosy pk.

RHODOMYRTUS.

A small genus (*ord.* Myrtaceæ) of greenhouse evergreen shrubs. Propagation, by cuttings beneath a bell-glass. Soil, fibrous loam three parts and leaf mould one part, with coarse sand.

Principal Species :—

tomentosa, 5′, Je., ro. (*syn.* Myrtus tomentosus). Indian Hill Guava.

RHODOSPATHA.

Stove evergreens (*ord.* Aroideæ), requiring a moist atmosphere. Propagation, by seeds or cuttings in a close pit. Soil, loam, peat, and sand.

Principal Species :—

blanda, 3′, sum., dull grn., yel.

RHODOSTACHYS.

Stove perennials (*ord.* Bromeliaceæ). Propagation, by suckers. Soil, light, rich, well-drained loam and peat.

Principal Species :—

andina, 1½′, Jy., ro. (*syns.* Bromelia carnea, B. longifolia, and Ruckia Ellemeti).
bicolor, 1′, sum., ro.
littoralis, 1½′, Jy., ro.
pitcairniæfolia, 1 to 2′, sum., sc.
— kirchhoffiana, 1′ to 2′, sum., bl.

RHODOTHAMNUS.

Almost prostrate-growing hardy shrubs (*ord.* Ericaceæ). Propagation, by cuttings. Soil, deep, sandy peat. It should be top-dressed occasionally with a little lime.

Only Species :—

Chamæcistus, 6″, spr., pk. (*syn.* Rhododendron Chamæcistus).

RHODOTYPUS.

A hardy shrub (*ord.* Rosaceæ). Propagation, by cuttings in a cold frame, or by suckers and layers. Any fertile garden soil suits.

Only Species :—

kerrioides, 12′, Ap., wh.

RHŒO.

Perennial stove herbs (*ord.* Commelinaceæ). Propagation, by division and cuttings in bottom heat. Soil, fibrous loam, with a little peat and sand.

Only Species and its Variety :—

discolor, 9″, aut., wh., pk. or bl., lvs. grn., pur. (*syn.* Tradescantia discolor).
— concolor, lvs. grn.

Rhodora (*see Rhododendron*).
Rhodostoma (*see Palicourea*).

RHOPALOBLASTE.

Stove Palms (*ord* Palmæ). Propagation, by imported seeds sown in strong heat. Soil, mellow loam.

Principal Species :—

hexandra, 6′, lvs. much divided, rich grn.
singaporensis (*see* Ptychoraphis singaporensis).

RHOPALOSTYLIS.

Tall-growing, Kentia-like Palms (*ord.* Palmæ), thriving in the greenhouse. Propagation, by imported seeds. Soil, sound loam.

Rhododendron Grievei (*see p.* 271).

Principal Species :—

Baueri, 20′ (*syn.* Areca Baueri).
sapida, 20′ (*syns.* Areca sapida and Kentia sapida).

RHUBARB.

Description.—This is one of the most valuable vegetables (*ord.* Polygonaceæ) grown in the garden, because it possesses such marked medicinal properties. The crop is often a neglected one, as growers appear to think that good Rhubarb can be obtained with the smallest amount of attention.

Propagation.—By seeds sown in early autumn in drills 3′ or 4′ asunder. The ground should previously have been deeply dug, and well enriched with thoroughly decayed natural manure. The plants must be thinned until at the finish they are 3′ apart for the smaller and 4′ for the larger varieties. Or the stools may be lifted and divided in spring, retaining three buds to each portion, and replanted in soil prepared as for seedlings. This is the usual method for keeping the varieties true to character.

Soil.—A deep, friable loam in an open position. Excellent produce may, however, be grown in any ordinary garden ground if it be well worked and manured.

Other Cultural Points.—Each year after the leaves have died the bed should be cleaned, the surface soil loosened and heavily dressed with good stable manure. This may or may not be pointed in at discretion. In spring the soil should be lightly loosened, and at no period should weeds be allowed to become established. The flower spikes should be removed.

Forcing Rhubarb.—This may be done by covering the stools with inverted tubs or baskets, surrounding these with litter, or, and by far the best plan where a quantity is required, by lifting the stools and placing them in any convenient dark position in heat. Stools that have been lifted and forced are not worth saving, and a method must therefore be adopted whereby the stock is always fully maintained. Thus, as lifting proceeds, the stools should be divided, the smaller pieces being replanted, and the much larger section used for forcing. It is essential to the greatest success in forcing that the clumps be sharply frozen before being taken indoors. A Mushroom house is a splendid place for forcing.

Selection of Varieties :—

For Forcing :—
Daw's Champion. The Sutton Forcing.

For General Use :—
Hawke's Champagne. Linnæus. Victoria.

Rhopala (*see Roupala*).
Rhopalostigma of Schott (*see Staurostigma*).
Rhubarb, Prickly (*see Gunnera*).

RHUS. (SUMACH.)

Description.—A large genus of stove, greenhouse, or hardy trees or shrubs (*ord.* Anacardiaceæ), generally of an ornamental character, though with small flowers. A few are valued for their products, as Coriaria for yielding the Sumach or Shumac, and Cotinus for the yellow dyewood Young Fustic. Copallina produces a resin made into varnishes. Many species are poisonous, particularly the American Toxicodendron, the Poison Oak. Venenata is equally poisonous when touched. The most useful for the garden or shrubbery are the hardy species, and among these Cotinus, the Smoke Plant, may be mentioned as of pretty appearance after flowering. Cotinoides, Cotinus, and typhinus give fine autumnal tints. Typhina may be treated like Paulownia imperialis, its autumnal leaves and fruits being showy.

Propagation.—The hardy species by cuttings and layers, and some by root cuttings. The tender species by cuttings.

Soil.—Common soil.

Principal Species and Varieties :—

aromatica, 8′, Ap., hdy., yel. (*syns.* canadensis and suaveolens).
copallina, 1′ to 7′, Jy., hdy., grn., yel.
Coriaria, 15′ to 20′, Jy., hdy., greenish wh.
cotinoides, 6′ to 20′, Ap., hdy. (*syn.* Cotinus americanus).
Cotinus, 6′ to 8′, Je., hdy., pale pur. (*syn.* Cotinus Coccygea). Smoke Plant.
— atropurpurea, deeper foliage and seed plumes.
—pendula, drooping habit.
diversiloba (*see* Toxicodendron).
glabra, 5′ to 18′, Je., hdy., yel., greenish red (*syns.* caroliniana, coccinea, elegans, and sanguinea).
— laciniata, cut foliage.
lucida, 4′ to 6′, Jy., grh., wh.
Michauxii, 2′ to 3′, sum., hdy.
Osbeckii, 20′, Jy., grh. (*syn.* semialata Osbeckii).
succedanea, 10′ to 15′, Je., grh., greenish yel. (*syn.* Toxicodendron altissimum). Red Lac Sumach.
Toxicodendron, Je., hdy. cl., greenish yel. (*syns.* ambigua, diversifolia japonica, Ampelopsis Hoggii—Japanese forms—etc.). Poison Oak or Ivy.
— radicans, trailer (*syn.* radicans).
trichocarpa, 25′, sum., hdy.
typhina, 10′ to 30′, Je., hdy., greenish yel. (*syns.* americana, canadensis of gardens, not of Michaux, frutescens, etc.; *see* figure). Stag's Horn Sumach, Vinegar Tree.
— arborescens, 10′ to 25′.
— frutescens, 2′ to 10′.
venenata, 6′ to 18′, Jy., hdy., grn. (*syns.* vernix of Linnæus and Toxicodendron pinnatum). Poison Elder, Swamp Sumach.
vernicifera, 30′, Je., grh., greenish yel. Japan Lacquer or Varnish Tree.
villosa, Jy., grh., greenish yel.

RHYNCHANTHUS.

Tuberous-rooted stove perennials (*ord.* Scitamineæ), requiring considerable atmospheric moisture in summer. Propagation, by division. Soil, rich, fibrous loam.

Principal Species :—

longiflorus, 1½′, Jy., greenish yel.

RHYNCHITES.

A genus of weevils injurious to trees. Shaking the branches and holding a sheet to catch the insects is the best remedy.

RHYNCHOGLOSSUM (*syns.* ANTONIA, LOXOTIS, RHINCHOGLOSSUM).

Greenhouse biennials (*ord.* Gesneraceæ). Propagation, by seeds sown in heat in spring, and

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RHUS TYPHINA.

subsequently pricked off and repotted as necessary. Soil, equal parts of loam and peat with coarse sand.

Principal Species :—

obliquum, 1′, Jy., bl. (*syn.* zeylanicum).

RHYNCHOSIA.

Stove or warm greenhouse trailing or twining plants (*ord.* Leguminosæ). Propagation, by seeds in sandy soil, in heat. Soil, loam, leaf mould, and sand.

Principal Species :—

Chrysoscias, 8′, My., yellowish or.
cyanosperma, 10′, sum., reddish pur.
— albiflora, creamy wh. (*syn.* Cylista albiflora).
phaseoloides, 8′, Je., Jy., yel., pur. (*syn.* Glycine phaseoloides).

RHYNCHOSPERMUM of LINDLEY

(*see* TRACHELOSPERMUM).

RHYNCHOSTYLIS.

Low-growing epiphytes (*ord.* Orchidaceæ), of neat habit. Stove treatment and basket culture as applied to Saccolabiums suit admirably.

Principal Species :—

cœlestis, 1′, spike 1½′, erect, sum., wh., bl. Cambridge Lodge var. and superbum are distinct vars.
retusa, 6″, spike 1½′, drooping, sum., wh., pur. (*syn.* Blumei). The finest vars. are guttata, Heathii, pure wh., holfordiana, and præmorsa.

RHYNCHOTECHUM.

Stove plants (*ord.* Gesneraceæ) of somewhat shrubby habit, and needing similar treatment to the shrubby species of Besleria, which *see*.

Principal Species :—

ellipticum, 2½′, sum., rosy red.

RHYTIDOPHYLLUM.

Shrubby stove plants (*ord.* Gesneraceæ) that succeed with shrubby species of Besleria and Gesnera, which *see*.

Principal Species :—

auriculatum, 1′, Aug., greenish yel., spotted red.
tomentosum, 2′ to 3′, sum., greenish yel., spotted pur. (*syn.* Gesnera tomentosa).

RHYTISMA.

A small genus of Fungi that sometimes attacks the leaves of hardy trees. The principal species is acerinum, which produces the blackish spots or blotches on Maple and Sycamore leaves during summer and autumn. Its spread on young trees can be prevented by spraying with a solution of potassium sulphide, or by the removal of affected leaves. (*See* FUNGICIDES.)

RIBES. (CURRANT. GOOSEBERRY.)

Hardy deciduous shrubs (*ord.* Saxifrageæ). Propagation, by cuttings in summer and autumn, or by seeds sown when ripe or in spring. Ordinary garden soil. Those which flower early, and some Californian species, such as speciosum, should have a light soil and the protection of a wall in cold districts. (*See also* CURRANTS and GOOSEBERRIES.)

Principal Species, Hybrids, and Varieties :—

alpinum, 3′, spr., greenish yel., fruit sc.
— foliis aureis, lvs. yel.
— pumilum, dwarf.
— sterile (*syn.* dioicum).
aureum, 6′ to 8′, Ap., yel., fruit yel. or blk., edible.
— aurantiacum minus, deep yel., dwarf.
— præcox, flowers early.
— serotinum, Je., yel.
— tenuiflorum (*syn.* tenuiflorum of Lindley).
gordonianum, 6′ to 8′, spr., yel., red, hybrid (sanguineum × aureum) (*syns.* Beatoni and loudonianum).
Grossularia (*see* Gooseberry).
nigrum. Altaicum, dissectum, laciniatum (*syn.* aconitifolium), reticulatum aureum, and variegatum are vars. Black Currant.
rubrum. Red Currant. Album (White Currant), foliis luteo-variegatis, and Schlechtendalii are vars.
sanguineum, 4′ to 8′, spr., ro., fruit dark pur.
— albidum, whitish.
— atrorubens, deep ro.
— atrosanguineum, darker.
— carneum, pale ro. (*syn.* carneum grandiflorum).
— flore-pleno, double; others are epruinosum, glutinosum (*syn.* R. glutinosum), intermedium, and malvaceum (*syn.* R. malvaceum).
speciosum, 4′ to 8′, sum., red, fruit red (*syns.* fuchsioides, stamineum, and Robsonia speciosa).

Other Species and Varieties :—

americanum, 4′, sum., whitish, fruit blk. (*syns.* campanulatum, floridum, missouriense of gardens, not Nuttall, etc.). American Black Currant.
bracteosum, 5′ to 8′, grn., fruit blk.
cereum, 3′, sum., wh., fruit red (*syns.* inebrians, Kunthii, mexicanum, and reniforme).
Cynosbati, 4′, grn. (*syns.* gracile and Grossularia Cynosbati). Dog Bramble.
diacantha, 4′, My., greenish yel.
divaricatum, 5′ to 7′, sum., wh., fruit blk., edible (*syns.* triflorum and villosum of Nuttall, not Gay).
fasciculatum, Ap., yel., fruit red.
integrifolium, 3′, greenish yel.
japonicum, 3′, spr., grn., fruit red (*syn.* alpinum japonicum).
lacustre, 4′, greenish yel. (*syn.* echinatum).
Lobbii, 6′, Ap., pur., wh. (*syn.* subvestitum of *Botanical Magazine* 4931).
Menziesii, 2½′ to 5′, Mch., ro.
multiflorum, 4′ to 6′, greenish yel., fruit red (*syns.* album multiflorum, urceolatum, and vitifolium).
oxyacanthoides, 2′ to 3′, grn., fruit red or bl. (*syn.* hirtellum, irriguum, saxosum, and setosum).
— Purpusii, grn., fruit blk., red.
prostratum, My., trailer, grn., fruit red (*syns.* glandulosum, hudsonianum and trifidum).
punctatum, 3′, tender, yellowish grn.
Roezlii, 3′, wh., red.
rotundifolium, 4½′, brownish wh., fruit dark red (*syns.* gracile of Pursh, not Michaux, and triflorum).
villosum, Je., yel. (Gay, not Nuttall) (*syns.* Bridgesii and Lavallei of gardens).

RICHARDIA. (ARUM LILY.)

Description.—A genus of greenhouse or almost hardy South African plants (*ord.* Aroideæ). The recent introduction of new varieties of africana, the Arum Lily or Calla, and of several new species, has given a stimulus to the cultivation of these plants, which are of the highest decorative value on account of their fine leaves and beautiful spathes, the so-called "flowers."

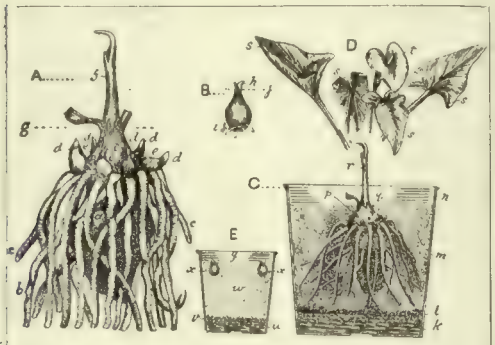
Rhynchocarpa (*see Kedrostis*).
Ribbon Fern (*see Pteris serrulata and Vittaria*).
Ribbon Grass (*see Phalaris arundinacea variegata*).
Ribbon Tree (*see Plagianthus*).

Rice (*see Oryza sativa*).
Rice Flower (*see Pimelea*).
Rice Paper (*see Fatsia papyrifera*).

Propagation.—By division, offsets and seeds. Spring is the most suitable time.

Soil.—Rich, fibrous loam with well-rotted cow manure.

Other Cultural Points.—The old system of drying off Richardias is falling into desuetude, and they are now kept growing in the pots, or planted out in summer, and taken indoors before the approach of frost. Trouble is saved by planting them out in rich soil in early summer, keeping them well supplied with water, and lifting and repotting one in a 6″ or two or three in a larger pot in the beginning or middle of September. A



Potting Richardias (Arum Lilies).

A, rootstock: *a*, older portion; *b*, old roots; *c*, new roots; *d*, "bulblets" formed at base of crown or from previous year's growth of rhizome; *e*, bulblets just pushing on crown; *f*, growing point; *g*, depth of potting.
B, bulblet: *h*, growing point; *i*, base from which roots issue; *j*, depth of inserting.
C, rootstock from which bulblets and buds have been removed and properly potted: *k*, drainage (crocks); *l*, rough compost; *m*, soil; *n*, space for water; *o*, rhizome of plant; *p*, points from which pushing bulblets have been removed; *q*, new roots emitted; *r*, point of growth.
D, leaves and spathe of Little Gem Lily: *s*, leaves; *t*, spathe.
E, bulblets properly potted at the sides of a 3″ pot: *u*, drainage; *v*, rough compost; *w*, soil; *x*, bulblets of Little Gem Richardia; *y*, space for water.

sheltered position must be selected for their summer cultivation. Africana can be grown in mild districts as a hardy aquatic if the crowns of the plants are so deep in the water that frost cannot reach them. The other Richardias require a higher temperature, a lighter soil, and a longer rest than africana, which does well with one of 40° to 50° in winter.

Richardias are much benefited by weak liquid manure. Keep down green fly.

Principal Species and Varieties:—

africana, 2′, spr., sum., wh. (*syns.* æthiopica and Calla æthiopica). Lily of the Nile, White Arum Trumpet Lily.
— devoniensis, 1½′, free bloomer.
— grandiflora, taller, larger spathes.
— Little Gem, a rather shy bloomer. Godfrey's var. is better.
— nana compacta, 1′.
— Perle von Stuttgart, 1½′, purer wh. than type.
albomaculata, 2′, sum., greenish wh. lvs. with wh. blotches.
— sulphurea, soft yel., blk centre.
elliottiana, 3½′, Aug., yel.
hastata, 2′, sum., greenish yel. (*syns.* aurata and Lutwychei).
melanoleuca, 1½′, sum., pale yel., blackish pur. at base. Suffusa is a vigorous var.
Pentlandii, 2′, sum., deep yel., purplish blk. at base (*syn.* angustiloba).
Rehmannii, 2′, sum., rosy pur. or wh., margined ro. (*syn.* Lehmanni).
Rhodesia, golden yel.

RICHARDSONIA.

Stove evergreens (*ord.* Rubiaceæ). Propagation, by cuttings in very sandy soil, beneath a bell-glass, over bottom heat. Soil, peat, loam, and coarse sand.

Principal Species:—

pilosa, 2′, Sep., wh. (*syns.* scabra and Richardia scabra). Mexican Coca.

RICHEA.

Greenhouse shrubs or trees (*ord.* Epacrideæ). Propagation, by cuttings in sandy peat, beneath a bell-glass, over gentle heat. Soil, fibrous peat and coarse sand.

Principal Species:—

pandanifolia, 6′ to 30′, sum., wh., pk.
sprengelioides, 5′, Je., red.

RICINUS. (Castor Oil Plant.)

A handsome tree, usually treated as a half-hardy annual (*ord.* Euphorbiaceæ). It is largely used for its sub-tropical effect in summer. From its seeds the medicinal castor oil is extracted. Propagation, by seeds, sown singly in small pots about the end of March in heat. Repot into larger sizes as required; keep growing under glass until early in June. If checked in their growth their beauty will be greatly lessened. A rich, well-manured soil is needed.

Only Species and Principal Varieties:—

communis, 3′ to 5′, Jy., grn. (*syns.* armatus, etc.; *see p.* 277).
— borboniensis, 5′, lvs. bronze grn.
— cambodgensis, lvs. pur., stems and branches blk.
— cinerascens, lvs. brownish pur.
— Gibsonii, lvs. bronze pur.
— Gibsonii atrosanguineus, lvs. crim. red.
— maculatus, lvs. coppery bronze, veined red.
— zanzibarensis, 6′ to 8′, lvs. large, grn., vein. wh., seeds large.

RICOTIA.

Hardy annuals (*ord.* Cruciferæ). Propagation, by seeds. Any fertile garden soil.

Principal Species:—

Lunaria, 6″, Je., lil. pur. (*syn.* ægyptiaca of Linnæus and *Botanical Register* t. 49).

RIDGING.

Heavy ground is much improved, if, when dug or trenched in the autumn, the surface is left as rough as possible, so that frost, snow, wind, and rain may act upon it. Such action enriches the soil by the disintegration of parts previously solid and also brings it into a better working condition by seed time. A further step in this direction is ridging, which consists in leaving the surface in parallel ridges so that a larger quantity of the soil is exposed to the elements than could otherwise be. In the spring these ridges work down easily and finely under fork and rake.

Ridging for summer crops such as Marrows and Cucumbers is conducted on a larger scale. The

Ricinella (*see Adelia*).
Ridan (*see Actinomeris*).

ridges are made up with the aid of long manure, and are flattened at the top. The object in this instance is to secure a warm rooting medium by ensuring free drainage and the largest possible exposure to sunshine.

RIGIDELLA.

Half-hardy bulbous plants (*ord.* Irideæ). Propagation, by offsets. Soil, loam, peat and sand. Winter protection is essential.

Principal Species :—

flammea, 4′, My., or. pur. immaculata, 2′, Je., sc., yel.

RINGING.

As applied to a method of propagation, this term signifies the removal of a ring or band of bark from a branch that is to be layered. Ringing checks the return of sap, and if the part operated upon is firmly buried in soil or moss it also induces root-formation. Dracænas and other stove plants are often somewhat similarly treated, a ring being removed just below the leafy head and the wound bound up with damp moss, into which roots are soon pushed. In both cases severance from the stem or branch follows when the portion beyond the ring has sufficient roots to support itself. This process of ringing can also be, and is, used as a method of destruction. When colonial forest land is being cleared for farming it is often found easier to cut a deep ring round the base of the trunk, and let the tree die, than to lop, cut down, and uproot. Rabbits often cause the death of young trees by eating away an irregular ring of bark and soft wood.

RIOCREUXIA.

A greenhouse climber (*ord.* Asclepiadeæ). Propagation, by cuttings in spring, beneath a bell-glass, over gentle bottom heat. Soil, light, well-drained loam.

Only Species :—

torulosa, 10′, sum., yel., grn.

RIPENING WOOD.

When, at the end of a season, the growth produced therein is hard, with the bark firm and the buds plump, it is said to be ripe, *i.e.* in a fit state to pass through the winter unharmed. The progress of the seasons ensures a ripening process, but it may be aided very considerably in the case of fruit trees and bushes, flowering trees and shrubs, etc., by a judicious thinning out of branches, so that sunlight and air may have full play on leaf and stem. Summer pruning among fruit trees materially assists wood ripening. Unripe wood is soft, and the bark usually quite green.

Photo : Cassell & Company, Ltd.

RICINUS COMMUNIS (*see p.* 276) IN THE BEDS AT KEW.

Chrysanthemums, Orchids, and many winter-flowering plants grown under glass, must all have properly ripened or matured growth if they are to be successfully managed, and in these cases it is desirable to give the plants such assistance as shall enable them to finish growth early in the autumn. Unripe Chrysanthemum growths produce unsatisfactory blooms, and unripe Orchid growths suffer badly during the dull winter months, and often fail to flower.

RIPE ROT OF FRUIT.

This is caused by a widely spread Fungus, Monilia fructigena, which attacks Apples, Plums, Cherries, etc., but chiefly Apples. Brown patches are first formed on the leaves, and afterwards on the fruit. These increase in size until the greater portion is covered. The diseased fruits do not rot, but remain on the trees or ground in a brown, mummified condition until the spring, spreading the infection the following season. Diseased fruits should be burnt or deeply buried, the trees sprayed with sulphate of iron before the buds expand, and later with Bordeaux Mixture. (*See* FUNGICIDES.)

RITCHIEA.

Stove shrubs (*ord.* Cappardieæ). Propagation, by cuttings, in sandy peat, in brisk heat. Soil, mellow loam and sand.

Principal Species :—

fragrans, 3′, Je., wh. (*syns.* Cratæva capparoides and C. fragrans).

polypetala, 6′, sum., straw yel.

Rivea (*see Argyreia*).

RIVINA.

Stove evergreens (*ord.* Phytolaccaceæ). Their value is increased if the plants are put in a cooler, drier atmosphere during fruiting. The flowers are inconspicuous, but are followed by bright berries, which remain on for a considerable time, and render the plants exceedingly attractive. They look well in conservatories, mixed with flowering plants. Propagation, by seeds, or cuttings in sandy soil in heat. Soil, light, fibrous loam, with coarse sand.

Photo : Cassell & Company, Ltd.

Robinia Pseudacacia robusta Vignei (*see p.* 279).

Principal Species :—

humilis, 2′, Je., wh., berries sc.; brasiliensis is probably a var.

Other Species :—

aurantiaca, 2′, sum., wh., berries or.
— pubescens, 6′, spr., pk.
lævis, flowers wh.
tinctoria, 4′, spr., wh.

ROADS.

As these have, in many cases, to carry heavy carts as well as withstand a considerable amount of pedestrian traffic, it is essential that they be properly formed. A badly made road soon becomes an eyesore and a nuisance, and is very expensive to keep in repair. The direction of the road having been decided upon, and pegs put in place to indicate the height, the soil should be removed, the top being used where it is required and the subsoil employed for levelling uneven places. The bottom must be rammed hard, and have a slight fall to each side to carry water to the sides, where loose earthenware pipes are laid for its reception. To these pipes gullies surmounted by traps will conduct the surface water. The gullies should be placed at intervals of from 20′ to 30′. For the foundation of a road to carry heavy vehicles 6″ of burnt clay is excellent and over this from 6″ to 9″ of broken granite, the whole being cased with 1½″ of fine gravel, which is watered in with the rolling. During showery weather the road should be heavily rolled as often as is convenient. A road made thus should last for years without need for extensive repairs.

ROBINIA. (Locust Tree.)

A small genus of hardy, deciduous, ornamental shrubs and trees (*ord.* Leguminosæ) of considerable value for the shrubbery or grounds, also for street planting. They are very pleasing with their pinnate leaves and bunches of Pea shaped flowers. Propagation, by root cuttings or layers. The choicer varieties are grafted on the typical Pseudacacia. Seeds may be sown in spring. Ordinary soil, if moderately dry.

Photo : Cassell & Company, Ltd.

Rochea coccinea (*see p.* 280).

Principal Species and Varieties :—

hispida, 3′ to 8′, My., ro., very ornamental (*syns.* montana and rosea).
— inermis, lvs. large, branches without prickles, superior to above (*syns.* complexa, hispida rosea, and macrophylla).
neo-mexicana, 30′, aut., ro.
Pseudacacia, 30′ to 60′, Ap., wh. Common Locust, False Acacia, Bastard Acacia.
— angustifolia, lvs. narrow.
— aurea, lvs. yel.
— bessoniana, round-headed.
— bessoniana latifolia, lvs. broad.
— crispa, leaflets curled.
— robusta Vignei, a fine var. (*see p.* 278).
decaisneana, flowers pk.
— fastigiata, pyramidal habit (*syns.* pyramidalis and stricta).
— inermis, round-headed bush.
— inermis albo-variegata, lvs. variegated.
— mimosæfolia, lvs. finely divided.
— pendula, drooping.
— semperflorens, flowers throughout sum.
— tortuosa, branches twisted.

Roan Tree (*see Pyrus Aucuparia*).
Robergia (*see Rourea*).

[Other forms of Pseudacacia are bella-rosea, coluteoides, elegans, heterophylla, linearis, monophylla, Rehderi, revoluta, sophoræfolia, and stricta.]

viscosa, 20′ to 40′, My., ro. (*syn.* glutinosa).

Other Species and Varieties:—

coccinea (now Ormosia coccinea). — luxurians, sometimes blooms twice a year.

dubia, 25′, Je., purplish ro., hybrid (?).

ROCAMBOLE.

The popular name given to Allium Scorodoprasum, a hardy perennial (*ord.* Liliaceæ). The plant forms bulbs or "cloves" in the same way as Shallots (correctly Eschallots) do, and also produces bulbs at the summit of the stem. The flavour of these is milder than Garlic, hence in many establishments it is preferred. Plant in spring or autumn, 6″ or 8″ apart each way, in fertile soil, and when the leaves die down lift, dry, and store the crop. Select firm, medium-sized bulbs for planting.

ROCHEA.

Free flowering, greenhouse, evergreen succulents (*ord.* Crassulaceæ). Propagation, by cuttings of the tops of unflowered shoots in late summer or early autumn. Pot as necessary and keep in a cool temperature throughout the winter. Pinch the shoots in spring when growth recommences. Soil, two parts loam and one part leaf mould with coarse sand and finely broken crocks or bricks. (*See also* CRASSULA.)

Principal Species:—

coccinea, 1′, Jy., sc. (*see p.* 279).

falcata (*see* Crassula falcata).

jasminea, 9″, Ap., wh.

versicolor, 2′, My., wh.

ROCKERY.

The term "rockery" covers a great variety of structures, many being ill adapted for the cultivation of dwarf plants, which thrive better or show to more advantage in elevated positions. Rockeries constructed of expensive material and at great cost are often less suitable for Alpine plants than those built of almost any stone, or even of clinkers covered with cement. In the formation of rockeries the plants' welfare ought to be the primary consideration, combined with an aim towards ornamental or natural appearances. Stone of a neutral colour is to be preferred to that which will draw the eye from the flowers or lessen their beauty. Thus, white spar destroys the effect of flowers of that colour, but grey limestone and red or grey sandstone improves their appearance, especially when the stones are toned down by the modifying influences of time. Vain imitation of the peaks of the Alps in miniature should be refrained from.

Photo: Cassell & Company, Ltd.

RODGERSIA PODOPHYLLA (*see p.* 281).

The site should be sheltered from cold winds by evergreen shrubs, such as Rhododendrons, or by walls or hedges, but the walls must be hidden as much as possible, and buildings should be kept out of view. The main body should consist of good, free soil, with plenty of rubble below for drainage. Against this mound the stones should be built in such a manner that rain may run into the rockery and not off it. This may be assisted by giving the stones a slight tilt inwards. As the work proceeds fill the crevices with suitable soil, made firm, but not quite solid.

Rock Broom (*see Genista*).
Rock Carrot (*see Thapsia edulis*).

Rockeries constructed of a series of terraces, supported by stones and flat on the surface, are very serviceable. Raised beds of earth, edged with stones, and with others inserted in the surface of the bed, will accommodate rock plants. A rockery built of solid stone, or formed of piles of stones without earth except on the surface, is of no value.

ROCKET.

The popular name "Rocket" is applied to several plants with long spikes of flowers, but generally to the varieties of Hesperis matronalis, which *see*. The Double Yellow Rocket is a form of Barbarea vulgaris. The Rocket Candytuft is Iberis coronaria, and the Dyer's Rocket is Reseda Luteola.

ROCK ROSE (*see* CISTUS and HELIANTHEMUM).

ROCKWORK (*see* ALPINE GARDEN and ROCKERY).

RODGERSIA.

Hardy herbaceous plants of imposing appearance (*ord.* Saxifrageæ). Podophylla, the best known species, has thick, fleshy, underground stems. The minute flowers are borne in large panicles, well above the leaves. Propagation, by division in spring. Soil, light loam and fibrous peat, or peat alone. A swampy place is desirable.

Only Species :—

pinnata, 2′ to 3′, sum., yellowish wh.

podophylla, 3′ to 4′, sum., yellowish wh. (*syn.* japonica; *see* p. 280).

RODRIGUEZIA.

Stove epiphytal Orchids (*ord.* Orchidaceæ), many of which are showy. They are usually of small stature, with small oval or rounded pseudo-bulbs, and graceful little spikes of flowers, of which the greatly enlarged lip is the most showy part. Propagation, by division as growth commences. Soil, fibrous peat, sphagnum moss, and charcoal.

Principal Species :—

Batemani, 9″, spr., wh., mauve lip.
Caloplectron, 1′, spr., yellowish wh.
candida, 1′, Ap., wh.
decora, 9′, Nov., pk. wh.
fragrans, sweet (*see* figure).
lanceolata (*see* secunda).
leeana, 1′, spr., whitish yel.; var. picta is better.
Lehmanni, 9″, spr., wh. ochre.
maculata, 6″, My., yellowish br.
refracta, 1′, spr., wh., tinged pur.
secunda, 6″, Jy., ro.

ROELLA.

Greenhouse sub-shrubs (*ord.* Campanulaceæ), not in general cultivation, though a few species are worth growing. Propagation, by cuttings of young shoots, in sandy soil, under a bell-glass in summer. Soil, fibrous loam, leaf mould, and sand.

Principal Species :—

ciliata, 6″ to 12″, Jy., wh., pur.
elegans, 9″, Feb. to My., bl.
muscosa, 6″, Aug., herbaceous, bl. (*syn.* cæspitosa).
spicata, 9″, Aug., wh. (*syn.* campestris).

Other Species :—

decumbens (now Wahlenbergia capensis).
squarrosa, 6″, Jy., wh.

RŒMERIA.

Hardy annual herbs (*ord.* Papaveraceæ), suitable for the front of the herbaceous border. Propagation, by seeds sown where the plants are to flower in spring. The young plants must be thinned to 6″ apart each way. Ordinary garden soil.

Principal Species :—

hybrida, 1½′, My., Je., vio. (*syn.* refracta).

Photo: D. S. Fish, Edinburgh.

RODRIGUEZIA FRAGRANS.

ROHDEA.

A dwarf-growing evergreen perennial (*ord.* Liliaceæ), with wide, deep green leaves produced from the rootstock in a dense rosette, and dense spikes of small whitish flowers. Propagation, by division. Soil, sandy loam. In a few favoured places it succeeds out of doors.

Rocket Larkspur (*see Delphinium Ajacis*).
Rock Jasmine (*see Androsace*).
Rock Lychnis (*see Lychnis*).
Rockspray (*see Cotoneaster*).
Rock Tobacco (*see Primulina Tabacum*).
Roddon (*see Pyrus Aucuparia*).
Rods, Burning (*see Landscape*).
Rochuck Berry (*see Rubus saxatilis*).
Rœpera (*see Zygophyllum*).
Rœzlia regia (*see Furcræa Bedinghausii*).
Roffia (*see Raphia*).
Rogation Flower (*see Polygala vulgaris*).
Rogiera (*see Rondeletia*).

Only Species :—

japonica, 1′, spr., wh.
— variegata, lvs. variegated.
nutans (*see* Tupistra nutans).
Tupistra (*see* Tupistra squalida).

ROLLER.

Every garden should possess a roller, for where gravel paths are to be well kept rolling is a necessary operation. The size of the roller should be in accordance with the width of the paths. Where many paths exist, rollers of different sizes should be kept, ranging in weight from 4 or 5 cwt. to 1 ton or 1½ tons. When making new paths it is advisable to roll twice, the first time with a light roller, afterwards with a heavy one. The best time to roll is after a fall of rain, as soon as the surface has become slightly dry, so that the gravel will not cling to the roller. Lawns are also improved by an occasional rolling.

ROMANOWIA.

A dwarf stove Palm (*ord.* Palmæ). One species only, Nicolai, is known. It grows a few feet high, and has a head of small pinnate leaves which are divided into about a dozen segments each. Propagation, by imported seeds. Soil, fibrous loam.

ROMANZOFFIA.

Hardy perennial herbs (*ord.* Hydrophyllaceæ) of tufted habit, resembling dwarf Saxifragas, and well adapted for the rock garden. Propagation, by division. They should be planted in sandy soil, in crevices between large stones.

Principal Species :—

sitchensis, 4″, Ap., wh. (*syn.* altera).

ROMNEYA. (Tree Poppy.)

The only species (*ord.* Papaveraceæ) is an ornamental plant with glaucous leaves and handsome flowers. In cold situations it is safer not to cut down the old stems until growth begins in spring. Small plants should be used for planting, unless they are turned out of pots. Propagation, by seeds, sown in spring under glass, and grown in single pots after being pricked out. Good, deep, well-drained soil.

Only Species :—

Coulteri, 2′ to 6′, sum., wh. (*see* figure).

Photo : Cassell & Company, Ltd.

Romneya Coulteri.

ROMULEA.

Greenhouse or hardy bulbous plants (*ord.* Irideæ) of attractive appearance. They may be cultivated in pots or borders. Propagation, by offsets. Soil, light loam. The plants should be well rested after flowering.

Principal Species :—

Bulbocodium, 6″, Je., hdy., yel., vio.
Columnæ, 6″, hdy., spr., greenish wh., veins pur.
ramiflora, 9″, My., hdy., yel., lil.
rosea, 6″, Jy., grh., ro., yel. at base.

RONDELETIA.

Showy flowering stove evergreen shrubs (*ord.* Rubiaceæ). The small flowers are borne in large bunches. Propagation, by cuttings of half-ripe shoots, in sandy soil, in a warm propagating case. Soil, equal parts of loam and peat, with sand. When growing, attention must be given to stopping and tying. After the flowers are over the plants should be well cut back, and restarted in a moist house. A weekly syringing with a weak

solution of kerosene emulsion (*see* INSECTICIDES) will keep insects at bay.

Principal Species :—

amœna, 4′, Je., pk. (*syns.* latifolia, versicolor, and Rogiera amœna).
Backhousei, 3′, sum., aut., pk.; best in peat.
gratissima, 4′, sum., aut., pk., sweet (*syn.* Rogiera gratissima).
odorata, 4′, sum., aut., sc., sweet (*syns.* splendens and speciosa); var. major is good.
speciosa (*see* odorata).

Other Species :—

cordata, 5′, sum., pk.
eriocarpa, 5′, sum., pk.

RONNBERGIA.

Stove perennials (*ord.* Bromeliaceæ). They require similar culture to Bromelias and Billbergias, which *see*.

Only Species :—

columbiana, 1′, sum., bl. (now Quesnelia columbiana).
morreniana, 1′, sum., bl.

ROOM PLANTS.

The selection of plants suitable for room decoration depends to a great extent on whether gas is burned in the rooms or not, and also on whether the plants have to be grown entirely in the rooms, or whether they are grown elsewhere, and are taken into rooms for a few weeks at a time. For apartments that are lighted or heated by gas, and where the plants have to be grown permanently in such atmospheres, the choice of subjects is very limited, the two best plants being Aspidistra lurida and Ficus elastica. Where rooms are lighted by gas, and the plants are only required for short periods, a much larger selection is available; Palms, Ferns, Dracænas, Crotons, and flowering plants of various descriptions all being of service. Where other means of lighting are employed almost any plant of a suitable size, and which does not require a very moist atmosphere, may be used for short periods, and a great many plants may be well grown in rooms all the year round. When plants are grown in other places, and are taken into rooms for a few weeks while in their best condition, care should be taken that the temperature of the room does not fall much below that of the greenhouse the plants have been growing in, and it should also be arranged that they are not stood in draughts, and that they do not receive a chill when being removed from one place to another. Plants stood in rooms should always be given the lightest positions available, and should be turned round daily so that an equal amount of sunlight gets to all parts. Watering needs special attention. No hard and fast rule can be laid down; it is impossible to say how many times a week certain plants should be watered; on that point the owner must use his own judgment. The usual test is to give the pot a sharp rap with the knuckles, and if water is required a ringing sound is made, whilst if the plant is wet enough a dull sound results. When the weather is mild, plants grown in rooms are benefited by being stood out of doors for a short time occasionally, especially if the weather is wet; this applies particularly to foliage plants. Room plants require repotting in a similar manner to other plants, but large, unsightly pots must be avoided. Plants that have become sickly should be destroyed, unless exceptionally good means are at hand for nursing them back to health. The majority of suitable plants can be bought at very reasonable prices, so that it is bad policy to endeavour to make a really sickly plant well again. The habit of buying plants in the streets or at the door in cold weather is to be condemned. The plants have generally been grown in warm houses, and the violent change of temperature is disastrous to them. The plants appear in good health when bought, but a few days' sojourn in a warmer temperature suffices to turn the leaves yellow, and finally brown. An occasional sponging of the leaves of foliage plants with tepid water and a little soft soap is necessary to keep the plants in good health.

As has been previously stated, almost any plant may be used as a room plant, some of the most popular being—

Selection of Popular Plants :—

Acacias, Aralias, Aspidistras, Chrysanthemums, Cinerarias, Clivias, Crotons (Codiæums), Cyclamens, Cytisus fragrans, Ferns (in variety), Ficus, Fuchsias, Geraniums (Pelargoniums), Lily of the Valley, Palms, and many others. Forced bulbs and shrubs are also useful, while many hardy evergreens are also pressed into service.

ROOT PRUNING.

This operation is performed on trees and shrubs to increase floriferousness and fruitfulness. It consists of making a trench at a distance from the trunk, and forking the soil from among the roots, cutting back thick roots which appear to be travelling for a considerable distance from the tree, and saving all the fibrous feeding roots that are found to be laid in again as the trench is refilled. When severing the thick roots care must be taken to get well under the tree, for often some of the thickest roots are found there. When the roots have been cut, the ends must be pared smoothly over, and the wounds dressed with tar. The operator must use judgment as to the number of roots to be removed. Trees that are growing very luxuriantly, and bearing little or no fruit, require the removal of a greater number of roots than trees that are only moderately luxuriant. In the case of large trees it is advisable to make the trench halfway round the tree the first season, and cut the roots on that side, leaving the other side till the following year. In the case of young trees it will sometimes be found sufficient pruning to lift and replant them, the loss of a few roots entailed by this proving a sufficient check. When planting, care should be taken not to bury manure beneath the trees, it being better to keep the manure nearer the surface to encourage surface roots. Trees with a good mass of surface roots rarely require root pruning, and if the operation has to be performed it is a much more simple matter. The best period for the operation is between the months of October and February. Peaches and Plums are more prone to make coarse, woody, unfruitful growth than Apples and Pears, but any tree which throws shoots more than 3 feet long in the growing season may be root pruned.

ROOTS.

It is even more important that a careful watch should be kept on the roots of plants than on the stems, for should the roots get into a bad condition plants are bound to go wrong. This being the case, it is highly desirable that everything in the vicinity of the roots should be kept sweet and clean,

anything approaching sourness having fatal results. Roots of trees may be divided into two groups, the strong main roots serving as anchors to the trees, holding them firmly against storms, and the fibrous feeding roots which are found at the extremities of the smaller roots. In many cases it is desirable to check the thick roots to aid in the production of feeding roots; this is done by root pruning. The production of feeding roots in preference to main roots is very advantageous in the case of fruit trees; in ornamental trees a circle of strong main roots should be left. When trees or shrubs are in nursery quarters the roots should be trimmed and got into good condition, otherwise when permanent planting is done deaths are certain to occur. Again, when planting in the nursery the planter should be careful to arrange the roots in a circle, not lay all to one side. The latter is injurious, as the tree is only anchored on one side, and should a severe storm come from the other direction the tree is almost certain to be blown over or disturbed. The aim of the cultivator should be to keep feeding roots as near the surface of the soil as possible, where they will obtain air. This can be done by keeping the best feeding material near the surface, and also by top-dressing. Trees growing in grass land are greatly benefited by having a circle 6′ or 8′ in diameter kept clear round the trunk and cultivated.

With pot plants it is also very necessary that ample drainage should be given, and a good, open, sweet compost be used. If the soil does become sour it should be washed away and a fresh start made. Whether indoors or outdoors the density of the soil is an important factor to success, some plants requiring the soil to be made very firm, others preferring it light. Fruit trees are on the whole best if the soil is made moderately firm, loose soil being conducive to luxuriant growth, while firm soil is productive of flowers and fruit.

In addition to ground roots there are air roots, such as are seen in epiphytal Orchids, etc.; these obtain all their moisture from the atmosphere.

ROSA.

Description.—An extensive genus (*ord.* Rosaceæ), yielding the most ornamental of all garden flowers. The favourite appellation, "The Queen of Flowers," is undeniably appropriate. Its habit, the form and colour of its flowers, and its fragrance have made the Rose an object of admiration from the earliest ages. Its commercial importance is great; in its cultivation many thousands of people are employed, raising plants, growing flowers for market, or producing the delicious Attar of Roses and other perfumes. Rose gardens devoted solely to Roses are among the most delightful features of large places. In beds on grass, in borders, separately, or among other flowers, they are very beautiful. Roses, as improved by cultivation, claim the greatest share of favour, but the species possess much grace and beauty. They are charming for wild gardening, shrubberies, or rock gardens. The climbing species are very pretty, covering trees, trellises, walls, or arches; but the cultivated Roses present even greater beauties for such purposes, and the popularity of Crimson Rambler has led to a rapid increase in the demand for free-growing Roses of similar character. For pillars many climbing Roses are very suitable, and it is, indeed, almost impossible to have too many in the garden. (*See* ROSE.)

Ropala (*see Roupala*).
Rosanovia (*see Sinningia*).

Principal Species, Hybrids, and Varieties :—

[NOTE.—Selections of garden Roses are given under ROSE.]

acicularis, 8′, Je., blush.
— nipponicus, ro.
alba, 4′ to 7′, Je., wh., blush. Several vars. Probably a hybrid (canina × gallica).
alpina, 3′, Je., pk. or red (*syns.* mermis and pendulina).
— pyrenaica, pk.
anemonæflora, wh. (*syn.* indica anemonæflora).
Banksiæ, 20′, Je., wh.; walls.
— lutea, yel.; walls.
blanda, 1′ to 3′, My., ro. (*syns.* fraxinifolia and lucida of gardens, not Ehrh).
— Fendleri, ro.
— Manettii, ro., semi-double.
— setigera, ro.
bracteata, 2′, Jy., wh. Macartney Rose.
— flore pleno, double wh. (*syn.* alba odorata).
— scabriuscula, Jy., wh.
canina, 6′ to 8′, Je., pk. to wh. Many vars. Dog Rose.
centifolia, 3′ to 6′, Je., rosy pur. Cabbage Rose. This and the following vars. have given many fine garden forms.
— muscosa, ro. or wh. Moss Rose (*see* Rose).
—pæstumensis,ro.,double or semi-double.
— parvifolia, small blooms (*syns.* burgundica, pomponia, and remensis).
cinnamomea, 6′, My., pale red.
— flore pleno, double flowers.
damascena, 2′ to 4′, Je., wh., red. Damask Rose.
— belgica, small flowers. Rose of Four Seasons.
— portlandica. Portland or Perpetual Rose.
— versicolor, red, wh. (*syn.* Rosa Mundi).
gallica, 2′ to 3′, red to crim. French (*see* Gallica Roses).
— Conditorum, the source of a perfume in Asia Minor.
— provincialis, red. Provence Rose.
indica, 4′ to 20′, Je., red. China or Monthly Rose.
— borbonica. Bourbon Rose.
— diversifolia, red.
— odorata, various. Tea Rose.
— sanguinea, blood red, semi-double,My. to Oct.
lævigata, 10′, Je., grh., wh. (*syns.* Camellia, camelliæfolia, sinica, hystrix, nivea, etc.). Cherokee Rose.
— Anemone, grh., pale ro.; hybrid.
Luciæ (*see* wichuraiana).
lutea, 3′, Je., yel. (*syns.* chlorophylla, Eglanteria, and fœtida). Austrian Brier.
— bicolor, sc., yel. (*syn.* punicea).
— flore pleno, double.
— Harrisoni, double yel.
moschata, 12′, Aug., yel., wh. (*syns.* Brownii, Brunonii, Brunonis, and Dupontii). Musk Rose.
multiflora, 12′, Je., wh., pk., or pur. (*syns.* polyantha and simplex).
— flore pleno, double.
repens, 2′ to 8′, Je., wh., yel. eye (*syn.* arvensis).
— capreolata. Ayrshire Rose.
— flore pleno, double wh.
rubiginosa, 5′, Je., pk. (*syns.* Eglanteria of Miller, not Linnæus, and suaveolens). Sweet Brier. Eglantine.
rugosa, 6′, Je., red. (*syns.* ferox and regeliana). Ramanas or Japanese Rose.
sempervirens, Je., cl., wh. (*syns.* longicuspis, prostrata, and scandens). Several vars. Evergreen Rose.
simplicifolia, 2′ to 3′, Je., grh., yel. (*syns.* berberifolia, persica, Hultheimia berberifolia, and Lowea berberifolia).
spinosissima, 1′ to 4′, My., wh. (*syns.* pimpinellifolia and scotica). Burnet Rose.
— altaica, taller, wh. (*syns.* altaica, grandiflora, and cistiflora).
wichuraiana, 3′ to 20′, trailer, Jy., wh. (correctly Luciæ).

Other Species, Hybrids, and Varieties :—

abyssinica, Je., cl., wh.
beggeriana, 10′, sum., wh. (*syn.* anserinæfolia).
— nigrescens, 10′, sum., wh., bracts sooty.
— Schrenkii, 10′,sum.,wh.

ROSES.

1. PRINCESS MAY; 2. MADAME ABEL CHATENAY; 3. BEN CANT, 4. BARDOU JOB; 5. LADY MOYRA BEAUCLERC; 6. LADY ROBERTS.

californica, ro.
— ultramontana.
carolina, 1′ to 7′, Je., pk. (*syns.* corymbosa, hudsonica, and pennsylvanica. Swamp Rose.
chinensis (*see* indica).
Engelmannii, 3′, Je., pk., near alpina.
fedtschenkoana, Je., wh., fragrant.
Fendleri, Je., pk., lvs. bright in aut.
ferox, 2′, Je., wh., yel.
ferruginea, 6′ to 8′, Aug., red, lvs. pur. (*syns.* pyrenaica, romana, and rubrifolia).
fortuneana, Je., wh. (Banksiæ × lævigata).
gigantea, Je., grh. cl., wh., pale yel.
glutinosa, 2′, Je., blush.
— yarmalensis, 2½′, Jy., wh., red.
gymnocarpa, 1′ to 4′, Je., red.
Hardii, Je., yel. (simplicifolia × involucrata).
heckeliana, 2′, Je., pk.
hemisphærica, 3′, Jy., yel. (*syns.* glaucophylla, Rapinii, and sulphurea).
heterophylla, wh., hybrid (rugosa × lutea).
hibernica, 2′, Je., pale pk. Vars. glabra, Grovesii.
hispida, 3′, Je., wh. (*syn.* lutescens).
humilis, 2′, Je., spreading, blush (*syns.* parviflora and microcarpa).
— triloba, petals with three lobes.
incarnata, 3′, Je., flesh.
involucrata, 3′, Jy., wh. (*syns.* clinophylla, Lyellii, and palustris).
— plena, wh., ro., double.
involuta, 2′, Je., wh. or pk. Vars. Sabini and Wilsoni.
laxa, 3′, Jy., wh., yel.
lucida, 2′, My., red (*syn.* baltica).
— flore pleno, double flowers.
macrophylla, 6′, Je., red.
micrantha, 4′, Je., pale red.
microcarpa, 10′, Jy., wh.
microphylla, 2′ to 4′, Aug., blush (*syn.* chlorocarpa).
— flore pleno, double flowers.
minutifolia, 2′, pk. or wh.
mollis, 2′ to 4′, Je., red (*syns.* mollissima and villosa in part).
montana, 6′, sum., wh., ro.
nitida, 2′, Jy., red.
noisettiana (indica × moschata; *see* Noisette Rose).
nutkana, 6′, Je., red.
orientalis, Je., ro.
phœnicea, Je., cl., wh.
pisocarpa, Jy., ro., small fruit (*syn.* pisiformis).
Pissardi, 15′ to 18′, wh.
pomifera, Je., pk., large fruit (*syn.* macrocarpa). Great Apple Rose.
rubella, 3′ to 1′, Je., red, probably a hybrid (spinosissima × alpina). Several vars.
sericea, My., cl., wh., pk., yel., tender in cold places.
setigera, Jy., cl., ro., wh. Prairie Rose.
stylosa, 6′, wh.
tomentosa, 6′, Je., rosy pk. Many vars.
turbinata, 5′, Je., red.
watsoniana, 3′, sum., wh., lvs. curious.
webbiana, 2′ to 5′, Je., pk.
xanthina, 3′, sum., yel. (*syns.* Ecæ and platyacantha).

ROSCHERIA.

Slender, stove Palms (*ord.* Palmæ), of graceful appearance, and interesting on account of the stem roots they produce. Melanochætes, the only known species, grows 20′ to 25′ in height, and bears pinnate leaves 3′ to 5′ long and 2½′ wide. (For cultivation, *see* PALMS.)

ROSCOEA.

Hardy or half-hardy herbaceous perennials (*ord.* Scitaminæ). The majority of the species are now included in Cautleya. The flowers are in terminal heads. Propagation, by division in spring. Soil, sandy loam. Planted at the foot of a south wall and covered with leaves in frosty weather they can be grown outside.

Principal Species :—

elatior, gracilis, lutea } (*see* Cautleya lutea).
purpurea, 2′, sum., pur.
spicata (now Cautleya spicata).

ROSE.

Cultivation.—Few flowers illustrate the advantages of cultivation and improvement so well as the Rose. The beauties of even wild species are vastly increased by cultivation, and those Roses raised by the hybridiser are developed to a very high degree. It may be said that few flowers respond so well to the care of the cultivator as the "Queen of Flowers." It is thus important that so beautiful a flower should have its requirements properly attended to.

Propagation.—By budding, grafting, cuttings, layers, seeds, suckers, and division. The first is the usual method. (*See* BUDDING and GRAFTING.)

Photo: Cassell & Company, Ltd.

CRIMSON RAMBLER ROSE IN A POT.

Cuttings.—Own-root Roses have advantages, one being that they may be cut to the ground by frost, and will grow again from a bud beneath the surface. Some varieties do not root freely, and others grow more weakly on their own roots than on stocks. Generally they live longer when grown thus. Many Roses strike freely in autumn from cuttings 9″ or 12″ long of ripened wood of the current season. These may be put in the open ground about 6″ deep and 12″ apart. Retain all the eyes, and tread the soil firmly about the cuttings. This only applies to the hardier Roses; the others are better struck in pots of light soil and kept in a cold frame until spring, when they may be put in gentle heat. Roses are largely propagated during summer from cuttings of partially ripened growths with two

or more buds. Those from forced plants may be struck, if planted thickly in a hotbed or close frame with a gentle heat, and potted when roots are made. Later, cuttings with leaves may be struck in the ground in a shady position under glasses or in a frame, watered, and kept close until they begin to make roots, when they may be gradually hardened off.

Layering is not much practised, except with Roses of vigorous habit. (*See* LAYERING.)

By Seeds.—This is a slow method, except in the case of a strain of the little Polyantha Roses (polyantha nana), which, if sown in heat in January or February, will bloom the same year. Seedling raising is, however, to be encouraged, although the proportion of prizes is very small, as it is by this means, and sports, that new varieties are obtained. Allow the heps to be quite ripe before removal (protection from birds is necessary). Then collect and keep in sand until spring, or rub out the seeds and keep them until that time. Sow in beds of free soil in the nursery, or in pans or boxes in a cold frame. Germination is irregular, and some of the young plants will not appear until the second year. Transplant as they can be handled in autumn to beds, with from 6″ to 12″ between the plants.

By Suckers.—Suckers from budded or grafted plants are useless unless they proceed from above the bud or graft, but Roses on their own roots often produce suckers. They should be taken off in autumn, cutting them out so as to leave no ragged wound.

Division is only suited for some of the species and own-root Roses which increase freely at the root. It may be done in autumn or early spring.

Soil and Situation.—The Rose naturally likes a heavy soil, though a few of the species seem as if they preferred a light one. A deep, strong loam, well drained, will grow Roses well. The beds should be trenched or bastard trenched, adding plenty of manure (bullock or cow manure preferred) as the work proceeds. Fresh yellow loam should be added to old garden soil, and burned earth and road sand to heavy clay. An open position, with a south or south-east exposure, is preferable, but Roses can be well grown elsewhere if not under trees. Some need a wall.

Photo: Cassell & Company, Ltd.

ROSE MILDRED GRANT (*see p.* 288).

Planting.—November is generally the best time for planting, though some prefer to plant the more tender Teas in spring; and the latter season has sometimes, through various circumstances, to be adopted for all. Plant a little below the point of budding in the case of dwarfs, and tread the soil firmly about the plants. Standards should be staked at once, and, if dry, watered.

Pruning.—There is much difference of opinion regarding when and how to prune, and something

depends not only upon the district, but also upon whether the Roses are for exhibition or only for decoration. For exhibition hard pruning is required. Shortening back to within 1′ or so of the bud or graft is a general practice at the time of planting. For the full pruning early March will suit if the Roses are planted in November or December, spring-planted Roses being pruned late in March or early in April. Prune moderate-growing varieties to two or three buds; the vigorous ones to five or six buds. Choose a bud which points outwards for the upper one. For decorative purposes thinning out, shortening, and keeping the bushes in form are all that are necessary. Directions for the various sections are given under Selections.

A good pot Rose.

After Culture.—The Rose should have good treatment at all times. Top-dress with cow or horse manure, or some artificial fertiliser. When this is not available liquid manure ought to be given, and plenty of water supplied in dry weather.

Roses in Pots or under Glass.—The beauty and utility of the Rose at all seasons leads to its being largely grown under glass, although the American system of growing in beds on raised benches under glass is not much followed here, Roses planted out being generally grown as climbers. Own-root Roses, or those on the Manetti or seedling Brier, may be used for 24's, and potted on as needed. From the open ground, pot in October in turfy loam, well-rotted manure, leaf mould, and a little sand. Plunge them under a north wall until severe frost, when they may be plunged in a cold pit, or until needed for forcing. This may begin as early as December or January, in a temperature rising from 45° to as much as 65° if plenty of air is given. Syringe daily until the blooms appear, and keep free from all insect and fungoid pests. After flowering place the Roses outside. A well-drained border is necessary for those planted out under glass, with plenty of water when in growth, and a period of rest during winter.

SELECTIONS OF ROSES:—

Hybrid Perpetuals:—

Prune in March as directed in the paragraph on pruning.

For Exhibition:—

Alfred Colomb, bright red.
Alfred K. Williams, car. red.
Capt. Hayward, car. crim.
Comte de Raimbaud, pur. crim.

Duchess of Bedford, crim.
Duchesse de Morny, ro., silvery reverse.
Dupuy Jamain, cerise.
Earl of Dufferin, crim., maroon.
Etienne Levet, car. red.
Ferd. de Lesseps, crim. vio.
François Michelon, ro., silvery reverse,
Madame Eugène Verdier, satin ro.
Madame Gabriel Luizet, silvery pk.
Marie Baumann, bright red.
Merveille de Lyon, wh.
Mrs. John Laing, pk.
Mrs. R. G. Sharman Crawford, rosy pk.
Prince Arthur, deep crim.

For Exhibition :—
Bridesmaid, pk.
Catherine Mermet, light ro.
Cleopatra, pale pk., edged ro.
Comtesse de Nadaillac, flesh, yel.
Madame Hoste, yel., wh.
Maman Cochet, car., salmon yel.
Maréchal Niel, golden yel. Noisette.
Mrs. Edward Mawley, car., shaded salmon.
Muriel Grahame, cream, flushed ro.
Souvenir d'Elise Vardon, cream, tinted yel., ro.
The Bride, wh.
White Maman Cochet, wh.

Photo : Cassell & Company, Ltd.

Rose Suzanne Marie Rodocanachi.

Gustave Piganeau, car. lake.
Helen Keller, rosy cerise.
Her Majesty, satiny ro.
Horace Vernet, red, pur., dark crim.
Suzanne Marie Rodocanachi, soft pk. (*see* figure).
Ulrich Brunner, cherry crim.
Victor Hugo, crim.

Teas :—

These are much hardier than supposed if planted in an open situation. Protect in winter with Bracken or other dry material, or cut to near the level of the ground, and earth up in districts where they are badly cut by frost. Dwarf Teas may be left unpruned until April, and then cut down to a good bud above the base. Climbers should have weak shoots only removed. Teas under glass may have the strong growths shortened, and the weak ones removed. When well grown the Teas give long successions of bloom, and are a most valuable class. They are splendid for cutting.

Hybrid Teas :—
Prune as the Teas.

For Exhibition :—
Bessie Brown, cream wh.
Caroline Testout, satin ro.
Countess of Caledon, car.
Gladys Harkness, salmon, silvery pk.
Kaiserin Augusta Victoria, yel.
Lady Mary Fitzwilliam, flesh.
La France, pk. ro.
L'Innocence, wh.
Marquise Litta, car. ro., vermilion centre.
Mildred Grant, wh. (*see p.* 286).
Mrs. W. J. Grant, pk. (*syn.* Belle Siebrecht).
White Lady, wh. (*see p.* 291).

Chinese or Monthly :—
These need little pruning except shortening in spring.
Climbing Cramoisie Supérieure, crim.
Ducher, wh.
Duke of York, rosy pk. to wh.
Eugène Beauharnais, amaranth.

Fellenberg, pk.
Laurette Messimy, ro., yel.
Madame Eugène Résal, rosy pk, shaded or.
Marie Sage, China ro., flesh.
Mrs. Bosanquet, pale flesh.
Old Blush, blush.
Old Crimson, crim.
Queen Mab, apricot, yel., or., rosy pk.

Climbing or Rambler (Polyantha) :—

Thin out old or useless wood, preserving strong shoots.

Aglaia, pale yel.
Carmine Pillar, car.
Claire Jacquier, nankeen.
Crimson Rambler, crim.
Electra, yel.
Euphrosyne, pk., centre wh.
grandiflora, wh.
Leuchtstern, ro., wh. eye, single.
Purple East, ro., car., pur.
Psyche, rosy pk., salmon yel.
Thalia, wh., semi-double.
The Lion, crim., single.

Ayrshire, Boursault, and Evergreen Climbers :—

Very hardy, and suitable for large walls, pillars, and trellises, or for growing up trees. Cut out weak wood and merely the tips of other shoots.

Alice Grey, wh., edged pk.
Amadis, pur. crim.
Beauté des Prairies, ro.
Belle de Baltimore, blush wh.
Bennett's Seedling, wh. (*syn.* thoresbyana).
Donna Maria, wh., shaded pk.
Félicité Perpétue, wh.
gracilis, bright pk.
Myrianthes Rénoncule, blush, edged pk.
Queen of the Belgians, wh.
russelliana, crim.
The Garland, nankeen, pk., wh.

Noisettes :—

Several are good as climbers on walls or pillars. Cut out weak or decayed wood, but where exhibition flowers are wanted prune hard back.

Aimée Vibert, wh.
Alister Stella Gray, yel., small.
Céline Forestier, pale yel.
Cloth of Gold, sulphur yel.
Lamarque, pale yel.
L'Idéale, yel., red.
Longworth Rambler, car. (*syn.* Deschamps). H.T.
Maréchal Niel, golden yel.
Ophirie, apricot.
Solfaterre, sulphur.
White Maréchal Niel, pale yel.
William Allen Richardson, or. yel.

Climbing Roses of Various Classes :—

(*See also* species under ROSA.)

[NOTE.—H.P. = Hybrid Perpetual ; T. = Tea-scented ; N. = Noisette ; H.T. = Hybrid Tea ; H.N. = Hybrid Noisette].

Aimée Vibert, wh. N.
Ards Rover, crim., shaded maroon. H.P.
Bardou Job, crim., semi-double. H.T.
Blairii No. 2, blush pk. H.N.
Bouquet d'Or, yel., coppery centre. T.
Carmine Pillar, rosy car., single. Polyantha.
Céline Forestier, yel. N.
Cheshunt Hybrid, cherry car. H.T.
Climbing Capt. Christy, flesh, darker centre. H.T.
Fortune's Yellow, yel., flaked car. N.
Gloire de Dijon, buff, or. centre. H.T.
L'Idéale, yel., red. N.
Madame Alfred Carrière, flesh, wh. H.N.
Madame Bérard, salmon, rosy yel. T.
Madame Pierre Cochet, golden yel. T.
Maréchal Niel, golden yel. N.
Mrs. Paul, blush wh., peach. Bourbon.
Paul's Single White, wh. H.P.
Reine Marie Henriette, cherry red. H.T.
Reine Olga de Wurtemburg, red. H.T.
Solfaterre, yel. N.

Miniature Provence :—

De Meaux or Pompon, rosy lil.
Spong, blush pk.
White de Meaux, wh.

Dwarf Polyantha :—

These should be well cut back after blooming.

Anna Maria de Montravel, wh.
Blanche Rebatel, crim., shaded ro.
Cécile Brunner, blush, pk.
Clothilde Soupert, wh., shaded pk.
Étoile d'Or, citron, chrome yel.
Georges Pernet, yellowish ro.
Gloire des Polyantha, pk., centre wh.
Lilliput, cerise car.
Little Dot, soft pk.
Ma Paquerette, wh
Mignonette, ro., changing to wh.
White Pet, wh.

Moss (Varieties of centifolia muscosa) :—

Very rich soil and close pruning.

Baron de Wassenaër, crim.
Blanche Moreau, wh.
Célina, crim., pur.
Common, pale ro.
Comtesse de Murinais, wh., blush.
Crested, ro.
Crimson Globe, deep crim.
Gloire des Mousseuses.
Lanei, cl., rosy crim.
Little Gem, crim.
Madame Moreau, ro., red.
Reine Blanche, wh.

Provence :—

Rich soil and close pruning.

Cabbage, rosy pk.
Celestial, pale blush.
Commandant Beaurepaire, ro., striped pur., wh.
Maiden's Blush, light blush.
Rosa Mundi, cherry red, wh.
Sancta, pale pk.
Tuscany, dark red.

Bourbon :—

Thin out, but do not shorten.

Acidalie, blush wh.
Bardou Job, sc., semi-double. H.T.
Baronne de Maynard.
Blairii No. 2, rosy blush.
Charles Lawson, ro.
Climbing Souvenir de la Malmaison, flesh.
Lorna Doone, magenta car.
Madame Isaac Pereire, rosy car.
Mrs. Paul, blush wh., ro.
Queen of Bedders, deep crim.
Sir Joseph Paxton, ro., crim.
Souvenir de la Malmaison, flesh.

Hybrid Brier (Lord Penzance's, etc.) :—

Leave unpruned, except to thin out old wood.

Amy Robsart, deep ro.
Anne of Geierstein, dark crim.
Brenda, peach.
Catherine Seyton, soft rosy pk.
Edith Bellenden, pale ro.
Flora M'Ivor, wh., tinted ro.
Green Mantle, ro., centre wh.
Jeannie Deans, crim., semi-double.
Julia Mannering, pearl pk.
Lady Penzance, coppery yel.
Lord Penzance, fawn.
Lucy Ashton, wh., pk. edge.
Lucy Bertram, crim., centre wh.
Meg Merrilies, crim.
Minna, wh., tinted blush.
Rose Bradwardine, ro.

Ramanas or Rugosa Varieties :—

Form huge bushes and make good hedges. Cut to keep in required shape.

alba, wh., single.
America, crim. lake.
Blanche Double de Coubert, wh., semi-double.
calocarpa, ro.
Madame Charles Worth, red, pur.
Madame Georges Bruant, wh., double.
Mrs. Anthony Waterer, red, semi-double.
Mikado, crim., semi-double.

Musk (moschata) :—

Remove old and small wood, and cut other shoots a little back.

Fringed Musk, wh.
Princesse de Nassau, cream, wh.
Rivers' Musk, cream, rosy lil.

Macartney (bracteata) :—

Beautiful but tender climbers, requiring a wall. Little pruning is needed except thinning out weak growths.

alba simplex, wh.
Marie Leonida, wh., blush centre.

Wichuraiana :—

Need little pruning. Suitable for trailing over banks or for low trellises.

Gardenia, cream, yel.
Manda's Triumph, wh., double.
May Queen, coral pk.
Pink Roamer, pk.
South Orange Perfection, wh., pk.
Universal Favourite, pk., double.
wichuraiana (*syn.* Luciæ), wh.

Scotch (spinosissima) :—

These are of various colours, and make neat bushes needing no pruning. Perpetual Scotch, Stanwell Perpetual, pk., Double Yellow Scotch, and others generally now sold by colour only.

Austrian Briers :—

Leave shoots almost full length, bend down, and thin out well.

Austrian Copper, copper, single.
Austrian Harrisonii, yel., double.
Austrian Persian Yellow, deep yel.
Austrian Yellow, yel., single.

Selection of Bedding Roses of Various Sections :—

Anna Maria de Montravel, wh. Polyantha.
Augustine Guinoisseau, wh., tinted flesh. H.T.
Blush China, blush. China.
Camoens, ro., base yel. H.T.
Captain Christy, flesh, wh. H.T.
Caroline Testout, satin ro. H.T.
Crimson China, crim. China.
Dr. Grill, copper yel., ro. T.
Fellenberg, pk. China.
Francisca Kruger, copper yel., peach. T.
Général Jacqueminot, crim. sc. H.P.
G. Nabonnand, flesh, yel. T.
Grüss an Teplitz, sc. crim. T.
Gustave Regis, yel., or. centre. H.T.
Hon. Edith Gifford, wh., flesh, salmon ro. centre. T.
Kaiserin Augusta Victoria, ro. H.T.
La France, pk. ro. H.T.
La France de '89, silvery, red. H.T.
Laurette Messimy, ro., yel. China.
Liberty, crim. H.T.
Madame Abel Chatenay, car. ro. H.T.
Madame Hoste, yel. T.
Madame Jules Grolez, China ro. H.T.
Madame Lambard, ro. T.
Marie van Houtte, canary, deeper centre, border tipped ro. T.
Marquise de Salisbury, red. H.T.
Mrs. John Laing, pk. H.P.
Mrs. R. G. Sharman Crawford, rosy pk. H.P.
Mrs. W. J. Grant, pk. (*syn.* Belle Siebrecht). H.T.
Papa Gontier, crim., yel. H.T.
Perle des Rouges, crim., cerise. Polyantha.
Perle d'Or, yel., or. Polyantha.
Rainbow, car., striped wh. H.T.
Souvenir de Catherine Guillot, or. red, car., yel. T.
Souvenir du Président Carnot, rosy flesh, shaded wh. H.T.
Viscountess Folkestone, creamy pk., salmon pk. centre. H.T.

Rose Aphis.—The aphis which is so troublesome to Roses is A. Rosæ. It is most prevalent in cold, dry weather in spring, especially on Roses exposed to cold draughts. Under glass it may be dealt with generally by fumigation in the ordinary way, and outdoors by syringing with Quassia and soft soap mixture, as directed under APHIDES. The enemy should be attacked as soon as it is observed, as it multiplies with extraordinary rapidity.

Rose Bedeguar.—This is a large gall found on the twigs of the Rose, and formed by the numerous cells in which are found the larvæ and eventually the pupæ of Rhodites Rosæ. This is a four-winged fly, generally black, with the exception of the legs of both sexes, and a portion of the abdomen of the female, which are brown. The Bedeguar is generally round, and is covered with moss-like green or red hairs. Removing infected portions and burning them is the best preventive of the spread of the disease.

Rose Galls.—In addition to the Bedeguar, the Rose is subject to several other galls. Those of Rhodites centifoliæ resemble Sweet Peas, and occur on Rosa Centifolia. On the Dog Rose (canina) and the Sweet Brier similar galls, formed by Rhodites Eglanteriæ, are found. R. Mayii also forms galls on R. canina, and R. Rosarum produces others like Peas, but with spines, on the leaves of several Roses. Then there are irregularly shaped red galls on the leaves and young shoots of R. canina and R. spinosissima, as well as small fleshy galls on the leaves of almost all Roses caused by the gnat called Cecidomyia Rosæ. Removing and destroying affected portions ought to be attended to as soon as possible.

Rose Grub.—The principal grub which infests the Rose is the larva of Tortrix bergmanniana, the Rose Tortrix, a small black moth. The grub itself is too well known to need description, and every Rose grower is unfortunately acquainted with its ravages. Hand-picking remains the best remedy, but various insecticides are often helpful. Anisopia horticola is the Rose Beetle, whose larvæ are sometimes called Rose Grubs by gardeners.

Rose Mildew.—The presence of Sphærotheca pannosa, a very injurious Fungus, is soon evident in the deformed and swollen calyces of the flowers and the blistered and distorted leaves. On examination the pale grey mycelium of the Fungus will be readily seen. Some varieties of Roses are more liable to its attacks than others, and it often attacks Roses which are much exposed to cold draughts. Powdered sulphur dusted over the parts affected, a mixture of one part of powdered quicklime to three parts of flowers of sulphur, or a solution of 1 oz. of potassium sulphide in 3 gallons of water, are all applied by experienced rosarians.

Rose Rust.—The Rose Rust (Uredo or Lecythea Rosæ) and Rose Brand (Phragmidium mucronatum), at one time considered two species of Fungi, are now believed to be respectively the summer and autumn forms of the same pest, Phragmidium mucronatum. In its earlier form this fungus shows itself in the shape of a yellow, dust-like substance on the under surface of the leaves, and is composed of one-celled bodies covered with prickly warts. The later form is formed of a row of cells, each with a dark brown warty coat, which shows like black clots. The removal of infected leaves, spraying the plants, and then dusting them with powdered sulphur, are generally recommended. Such a preparation as Abol may be used with advantage.

Rose Sawflies.—Among the many enemies of the Rose the sawflies (Tenthredinidæ) are conspicuous from the injury they inflict upon the leaves or twigs and, in some cases, even the pith of the plant. They are very numerous, and cannot be named and described in detail, but their presence will soon become apparent. Hylotoma Rosæ is the most destructive. The insects appear in May and

June, and also in autumn, and lay their eggs on the leaves, the larvæ eventually finding their way into the soil to enter the cocoon and pupa stages. Dusting with flowers of sulphur or Hellebore powder and syringing with Paris Green or Hellebore solutions are useful, as are hand-picking and shaking the plants.

Rose Scale.—The Rose is not exempt from the attacks of the scale insects (Coccidæ), with which most gardeners are only too well acquainted. The principal one attacking the Rose is Diaspis Rosæ, which appears in the shape of a grey or white scurf on the stems and twigs of the plants. Another is Lecanium Rosæ. Kerosene emulsion, Gishurst Compound, Abol, Fir tree oil, and Bordeaux Mixture have all been used with success, the first four as directed on the packages, and the last according to the instructions under BORDEAUX MIXTURE.

Rose Beetle.—Cetonia aurata commonly attacks the Rose. It also feeds upon the flowers of Strawberries and Apples, and not infrequently does a good deal of damage. Hand-picking is the best remedy.

Rose Acacia (*see Robinia hispida*).
Rose Apple (*see Eugenia Jambos and Jambosa*).
Rose Bay (*see Epilobium angustifolium*).
Rose Campion (*see Lychnis*).
Rosemary (*see Rosmarinus*).

ROSE OF HEAVEN (*see* LYCHNIS CŒLI-ROSA).

ROSMARINUS. (ROSEMARY.)

One species, officinalis, the Common Rosemary (*ord.* Labiatæ). The Rosemary has been in cultivation from time immemorial. It makes a dense bush 4′ high, clothed with small, deep green leaves, and white or lilac flowers. The leaves contain a fragrant essential oil in large quantities, which is used in perfumery, and is also one of the chief ingredients—as oil of Rosemary—of some hair washes. Propagation, by cuttings, seeds, and laye. Soil, light, sandy loam in a well-drained, sunny position. There are several varieties.

Photo: Cassell & Company, Ltd.

ROSE WHITE LADY (*see p.* 288).

ROTATION OF CROPS.

A system practised in gardens with the object of obtaining the maximum amount of material with the minimum loss to the soil. It is argued by old practitioners that it is not advisable to plant two successive crops belonging to the same natural order, as, for instance, Cabbages following Cauliflowers, or Beans following Peas. Again, two deep rooting crops should not follow one another, deep

Rose of the World (*see Camellia japonica*).
Rostellera (*see Mallotus*).

and shallow rooting crops being alternated. Crops in which the roots are used, such as Turnips, Beetroots, Parsnips, etc., should not follow each other, but be divided by Beans, Peas, or Cabbages. Celery might be succeeded by Beans or Peas, and these again by Potatoes, followed by Cabbages or Cauliflowers, and these again by root crops.

ROTHIA.

Two species of dwarf, spreading annuals (*ord.* Leguminosæ). Propagation, by seeds, in sheltered parts of the garden, in rather light soil.

Only Species Introduced :—

trifoliata, 2′, Jy., sulphur.

Rubus deliciosus (*see p.* 294).

ROTHMANNIA (*see* Gardenia and Randia).

ROUPALA (*syns.* Rhopala and Ropala).

Stove trees (*ord.* Proteaceæ), grown only in the juvenile state as fine foliage plants. At this stage the leaves are pinnate and smooth or rusty woolly. Propagation, by cuttings of mature wood in sand, under a bell-glass, and kept dry overhead. After some weeks, rooting may be hastened by plunging the pots in bottom heat. Soil, equal proportions of fibrous loam and peat, with sand.

Principal Species :—

aurea, lvs. with gold felt.
elegans, lvs. slender.
Pohlii, 6′ to 20′, lvs. with rusty or. felt (*syn.* corcovadensis).
Poortmanni, lvs. red with reddish br. felt.

ROUPELLIA.

One species of stove shrubs (*ord.* Apocynaceæ), sometimes climbing, bearing white or rose flowers in terminal heads. Propagation, by cuttings of side shoots, getting firm, in sand in a propagating case, with a fairly dry atmosphere. Soil, equal parts fibrous loam and peat, with plenty of sand. Grata flowers best when planted in a brick pit or narrow border to confine the roots. Train the shoots to the rafters. The roots must be kept rather dry in winter.

Only Species :—

grata, 6′ to 20′, My., pk. or flesh, very fragrant. Cream Fruit of Sierra Leone.

ROUREA.

Stove shrubs (*ord* Connaraceæ). Propagation, by cuttings in sand, in heat. Soil, fibrous loam, with a third of peat, and sand.

Principal Species :—

frutescens, 6′, wh. (*syn.* Robergia frutescens).
fulgens, 4′ to 5′, red.

ROYDSIA.

Shrubs (*ord.* Capparideæ), with fragrant flowers. Fruit Olive shaped, red. Propagation, by cuttings of side shoots in sand. Soil, fibrous, mellow loam, with plenty of sand.

Principal Species :—

suaveolens, Jan., My., dull red, yel., racemes or panicles 3″ to 7″ long, free flowering.

ROYENA. (Cape Snowdrop.)

Greenhouse evergreen shrubs (*ord.* Ebenaceæ). Propagation, by cuttings of shoots, getting firm, in sand, under a bell-glass. Soil, mellow loam and good peat, half and half, with sand.

Rottlera of Roxburgh (*see Mallotus*).
Rouge Plant (*see Rivina humilis*).
Rouhamon (*see Strychnos*).

Rowan Tree (*see Pyrus Aucuparia*).
Roxburghia (*see Stemona*).
Royal Bay (*see Laurus nobilis*).
Royal Fern (*see Osmunda regalis*).

Principal Species:—

glabra, 4′, Sep., wh.
hirsuta, 7′, Jy., pur.
lucida, 3′ to 5′, My., wh.
pallens, 4′ to 12′, wh. (*syn.* pubescens of Willdenow).
villosa, 4′ to 6′, wh.

ROYLEA.

Elegans, 3′ to 5′, July, white, flushed rose, the only species, is an evergreen greenhouse shrub (*ord.* Labiatæ). Propagation, by cuttings of young shoots getting firm at the base, in sand, under a bell-glass. Soil, fibrous loam, with a third of leaf mould and sand.

RUBIA.

Hardy herbs, or sometimes evergreen and subshrubby at the base (*ord.* Rubiaceæ), with small, yellowish or white flowers, of little garden value. Propagation, by division of the herbaceous species, and by cuttings of the evergreens under a handlight in summer. Any good garden soil for the herbs; peat and sand for the evergreens. A red dye known as madder is obtained from Tinctorum.

Principal Species:—

cordifolia, 3′ to 4′, Jy., wh.
peregrina, 1′, sum., yel.
Tinctorum, 4′, Jy., yel.

RUBUS. (RASPBERRY AND BRAMBLE.)

Description.—Hardy, half-hardy, and cool or warm greenhouse shrubs (*ord.* Rosaceæ). The Raspberry (Idæus) is universally esteemed for its fruit, as are several of the species termed Brambles or Blackberries. Some are highly ornamental, and valued either for their foliage, fruit, flowers, or coloured stems, in shrubberies, on lawns, or in the wild garden.

Propagation.—Seeds are sown to obtain new varieties. By cuttings for a few, but hardy species chiefly by layering. The tips of most of the Brambles root naturally when they come into contact with the soil, so that pegging them down would facilitate the process. Herbaceous species may be divided.

Soil.—Any well-drained garden soil, even if poor in character, but a deep, rich loam is the best, especially for the fruiting species (*see also* RASPBERRY and BLACKBERRY).

Photo: Cassell & Company, Ltd.

RUBUS BIFLORUS (*see p.* 294).

Other Cultural Points.—The stems of Brambles are generally more durable than those of the Raspberry, but when losing vigour they may be cut out to make room for younger ones. Herbaceous species, including arcticus and Chamæmorus, do well in moist peat beds on the rockery. Odoratus is sometimes planted in the sub-tropical garden for the sake of its handsome, palmately lobed leaves, which are increased in size by keeping the old stems well thinned out, or by hard pruning back annually in early spring, but it is not commonly grown. The greenhouse species do best when planted out in prepared beds, and trained to rafters or pillars. All are hardy, except where otherwise stated.

Rubentia (*see Elæodendron*).

Principal Species and Varieties :—

arcticus, 6″, Je., herbaceous, pk.; best in the rockery. Fœcundus is a fruiting form of arcticus.
biflorus, 6′ to 10′, My., wh.; stems white (*see p.* 293).
Chamæmorus, 4″ to 6″, sum., herbaceous, wh.; rockery. Cloudberry.
cratægifolius, 8′, My., stems wh.
deliciosus, 3′ to 6′, My., wh., spineless; handsome flowering shrub; fruit edible (*see p.* 292).
Idæus, 3′ to 8′, My., Je., wh. The Raspberry.
laciniatus, 6′ to 12′, sum., wh., fruit blk.; a valuable fruiting garden form. Cut-leaved or Parsley-leaved Bramble.
leucodermis, 6′ to 10′, Je., Jy., wh., fruit blk. Cumberland Black Cap or Whitewash Bramble.
nutkanus, 4′ to 6′, sum., wh., fruit yel. or reddish, edible. Nootka Sound Bramble.
odoratus, 3′ to 6′, sum., pur. red, fruit yel. Virginian Raspberry or Scented-leavedBramble.
phœnicolasius, 6′ to 25′, sum., pk., fruit crim.; makes delicious preserves; stems, petioles, and calyx covered with long pur. hairs. Wineberry.
rosæfolius, 3′ to 6′, Aug., hlf-hdy, wh., lvs. pinnate like a Rose (*syn.* pinnatus of Willdenow).
— coronarius (*see* thyrsoideus flore pleno).
— coronarius flore simplici, Strawberry-Raspberry.
sorbifolius, 3′ to 4′, lvs. pinnate, with narrow leaflets, hlf-hdy.
spectabilis, 4′ to 6′, My., ro. or red. Salmon Berry.
thyrsoideus flore pleno, 6′ to 12′, Jy., Aug., wh., double (*syns.* rosæflorus coronarius and fruticosus albus of gardens).
trifidus, 6′ to 8′, Jy., Aug., ro., showy.
ulmifolius flore pleno, 6′ to 12′, Jy., Aug., rosy pk., double (*syn.* bellidiflorus); a very handsome Bramble. Daisy-flowered Bramble.

Other Species, Hybrids, and Varieties :—

americanus of gardens (*see* villosus).
australis, 3′ to 8′, hlf-hdy. or grh., wh.; lvs. very variable, with large leaflets, or partly or wholly reduced to petioles (*syn.* schmidelioides).
bellidiflorus (*see* ulmifolius var.).
cæsius, 1′ to 2′, Jy., Aug., wh., stems trailing. Dewberry.
— foliis variegatis, lvs. variegated.
— turkestanicus, berries elongated, of good flavour.
ellipticus, 4′ to 6′, Aug., hlf-hdy., wh.
fruticosus albus (*see* thyrsoideus var. and ulmifolius var.).
japonicus, wh., stems slender, trailing.
— tricolor, lvs. variegated pk., but ultimately wh.
lasiocarpus, 5′ to 6′, Je., grh., pk.
macropetalus (*see* ursinus).
Millspaughi, 6′ to 8′, Aug., wh., fruit edible, stems spineless.
moluccanus, 3′ to 25′, Jy., grh., red (*syn.* rugosus).
nobilis, hybrid (odoratus × Idæus; *syn.* nepalensis of gardens).
pinnatus of D. Don (*see* lasiocarpus).
rugosus of D. Don (*see* moluccanus).
saxatilis, 6″, Je., wh., herb. Roebuck Berry.
schmidelioides (*see* australis).
thyrsoideus, 6′ to 8′, Jy., Aug., wh.
ulmifolius, 6′ to 12′, Jy., Aug., pk. (*syn.* discolor).
— foliis variegatis, lvs. variegated.
— inermis, spineless.
— leucocarpus, fruit wh. (*syn.* fruticosus leucocarpus).
— pomponius, double or semi-double, wh.
ursinus, 3′ to 5′, Aug., wh., habit of spectabilis (*syn.* macropetalus).
villosus, 3′ to 6′, Aug., wh. (*syn.* americanus of gardens).

RUBY TIGER MOTH.

This moth is known as Phragmatobia fuliginosa (*ord.* Lepidoptera). The perfect moth appears in May and July, and from the eggs laid the caterpillars hatch out in September, and feed for a time upon various low herbs, including a few garden plants, after which hybernation takes place, and they reappear to feed up in April. They should be collected and destroyed. The large size and thick mass of brown hairs make the caterpillars so conspicuous and easily detected that no excuse should be put forth for not exterminating them. Weeds that harbour and feed them should be cleared away.

RUDBECKIA. (Cone Flower. *See also* Echinacea and Lepachys.)

Showy hardy or greenhouse annual, biennial, and perennial herbs (*ord.* Compositæ), usually with elevated centres or discs, and drooping or spreading ray florets. The greater number are handsome border plants. Propagation, by seeds sown in spring or early summer in pots or in a frame, the seedlings being pricked off when large enough into pans or boxes, and grown on until fit to plant in their permanent places. Soil, any good garden soil, with plentiful supplies of water in spring and summer.

Principal Species and Varieties :—

[Note.—All are perennials, except where otherwise stated.]

californica, 4′ to 6′, Jy., yel., cone br.; difficult to grow where slugs abound.
grandiflora, 3½′, Sep., yel., cone dark pur. (*syn.* Centrocarpha grandiflora).
laciniata, 2′ to 7′, sum., yel., cone grn.
— Golden Glow, double. Newmanni (*see* speciosa).
speciosa, 2′ to 3′, sum., or. yel., cone dark pur. (*syn.* Neumanni or Newmanni).

Other Species and Variety :—

amplexicaulis, 1′ to 2′, Jy., yel., cone brownish (*syn.* Dracopis amplexicaulis).
angustifolia (*see* Echinacea).
bicolor, 2′, sum., bien., yellowish br.
— flore pleno, double.
columnaris (now Lepachys columnaris).
Drummondii, 1½′ to 2′, Jy., or. br. at base, cone grn. (*syn.* Obeliscaria pulcherrima of gardens, not De Candolle).
fulgida, 1′ to 3′, Jy., or., disc pur.
hirta, 1′ to 3′, Je., bien. or per., yel., disc br.
intermedia (*see* Echinacea purpurea).
maxima, 4′ to 9′, Aug., yel.
nitida, 2′ to 6′, sum., yel.
pinnata (now Lepachys pinnatifida).
purpurea, 2½′, Aug., reddish pur. (correctly Echinacea purpurea; *see p.* 295).
subtomentosa, 2′ to 5′, sum., yel., disc blk.

RUDGEA.

Stove evergreen shrubs (*ord.* Rubiaceæ), with leathery leaves. Propagation, by cuttings of firm shoots in sand, in a propagating case. Soil, good loam and peat, with sand.

Principal Species :—

macrophylla, 1′ to 3′, cream (*syn.* leucocephala).
nivosa, wh., flower heads smaller (*syn.* Psychotria nivosa).

RUDOLPHIA.

Twining stove plants (*ord.* Leguminosæ), allied to Erythrina, with flowers of some shade of red. Propagation, by young side shoots getting firm at the base, in sand, in a moist case. Soil, loam and peat in equal proportions, with plenty of sand.

Ruckia (*see Rhodostachys*).

Principal Species :—

dubia (now Centrosema hastatum).
rosea, 6′ to 8′, ro.
volubilis, 6′ to 10′, Jy., sc. (*syns.* portoricensis, scandens, and sericea).

RUE (*see* RUTA).

Photo : Cassell & Company, Ltd.

RUDBECKIA PURPUREA, *otherwise* ECHINACEA PURPUREA (*see p.* 294).

RUELLIA.

Sub-shrubby or herbaceous stove plants (*ord.* Acanthaceæ), valued for their flowers, and in some cases for their foliage. Propagation, by cuttings of the growing shoots in a case, or in a hotbed and covered with a bell-glass. Soil, fibrous loam, with a fourth part leaf mould, and sufficient sand to render it porous. Peat may be added to the more delicate rooting species.

Principal Species :—

devosiana, 1½′, herbaceous, wh., lvs. pur. beneath, with wh. veins.
formosa, 2′, Aug., sc. (*syn.* elegans).
fulgida, 2′, Jy., sc.
macrantha, 1½′ to 2′, win., rosy pur.; the best flowering one.
makoyana, 18′, sum., car. ro., lvs. olive grn., claret pur. beneath.
Portellæ, 1′, sum., ro., lvs. with pale veins, pur. beneath.
speciosa, 2′, Aug., sc. (*syns.* affinis and Dipter acanthus affinis).

Rue Anemone (*see Thalictrum anemonoides*).

Other Species :—

acutangala, 3′, My., herbaceous, sc., yel.
affinis (*see* speciosa).
cristata (*see* Aphelandra tetragona).
elegans of Poia (*see* formosa).
longiflora, 2′, Oct., pur. lil.
pulchella (*see* rubicaulis).
rosea, 18″, rosy pk.
rubicaulis, 1′, Jy., bl. (*syns.* fœtida and pulchella).
strepens, 2′, Jy., bl.
tuberosa, 2′, Jy., bl.
violacea, 9″, Jy., vio.

RUIZIA.

A small genus of stove shrubs (*ord.* Sterculiaceæ), with evergreen leaves and reddish flowers. Propagation, by cuttings of side shoots, getting firm at the base, in sand in a close case, in summer.

Soil, two-thirds loam, one-third peat, with sand. Lobata, 6′, and variabilis, 10′, May, are the only two of the five known species introduced.

RULINGIA.

Greenhouse shrubs (*ord.* Sterculiaceæ). Propagation, by cuttings of half-ripe side shoots in sand under a bell-glass, in summer, in gentle heat. Soil, two-thirds fibrous loam, and one-third peat and leaf mould, with sand.

Principal Species :—

hermanniæfolia, 2′ to 4′, Jy., wh. (*syns.* Byttneria hermanniæfolia and Lasiopetalum dumosum).
pannosa, 2′ to 3′, Je., wh. (*syns.* Byttneria dasyphylla, Commersonia dasyphylla, and Lasiopetalum tomentosum).
parviflora, 1′ to 2′, Ap., wh. (*syns.* corylifolia and Lasiopetalum prostratum).

RUMEX.

A large genus, mostly of troublesome weeds (*ord.* Polygonaceæ), but those mentioned below are more or less grown as potherbs. The roots of alpinus were formerly used for medicinal purposes, and although an exotic it is naturalised in the North of England and in Scotland. Propagation, by seeds in spring and by division in autumn or early spring. Any ordinary garden soil. Hydrolapathum is a handsome aquatic.

Principal Species :—

Acetosa, 1′ to 3′, sum., grn. Common or Garden Sorrel.
alpinus, 2′ to 4′, sum., grn. Monk's Rhubarb.
Hydrolapathum, 4′ to 6′, sum., grn.
Patientia, 4′, sum., grn. Herb Patience.
scutatus, 1½′ to 2′, sum., grn. French or Roman Sorrel, lvs. very acid.

RUSCUS. (Butcher's Broom.)

Hardy, evergreen, leafless shrubs (*ord.* Liliaceæ), with flattened, leaf-like branches and small, green flowers. They are useful as an undergrowth to larger shrubs, or for growing on the rockery. Aculeatus, the most ornamental of the true species of Ruscus, is British, and may be grown either in the open or under the shade of large deciduous trees. When the berries ripen they are very handsome, but to ensure this, care must be taken to have male and female plants in propinquity. Propagation, by seeds, and by suckers or division of the clumps. Any well-drained garden soil.

Principal Species and Varieties :—

aculeatus, 1′ to 3′, My., grn. (*syn.* flexuosus). Butcher's Broom. Laxus and rotundifolius are vars.
androgynus (*see* Semele androgyna).
Hypoglossum, 1′, My., pale yel. (*syns.* Hypophyllum Hypoglossum).
Hypophyllum, 1′, Je., grn. (*syns.* lugubris and microglossus).
— trifoliatus, 2′, grn.; larger growing.
latifolius (*see* Semele androgyna).
racemosus, 2′ to 4′, Ap., greenish yel. (now Danæa Laurus). Alexandrian Laurel.

RUSSELIA.

Stove sub-shrubs (*ord.* Scrophularineæ), with slender, evergreen, drooping stems, and small leaves, often reduced to scales. They are closely allied to Pentstemon. Propagation, by cuttings in sand in heat, and by suckers. The pendulous shoots root quickly when in contact with damp soil. Soil, mellow, fibrous loam, with a third of peat and leaf soil, and a good sprinkling of sand. They are beautiful subjects for baskets.

Principal Species :—

floribunda (*see* rotundifolia).
juncea, 2′ to 3′, Jy.
multiflora (*see* sarmentosa).
rotundifolia, 4′, Je. (*syn.* floribunda).
sarmentosa, 3′ to 4′, Jy. (*syns.* americana, flammea, multiflora, paniculata, polyhedra, syringæfolia, and ternifolia).

RUST.

Description.—As applied to the berries of Vines, rust is an injury of the skin rather than a disease. Various explanations of the phenomenon have been given, but the best authorities are agreed that the rusty or brown colour is the result of an injury to the surface of the berries while very young and tender. As the berries grow, the injured portions of the skin harden and become discoloured, thus disfiguring the Grapes when mature. White-skinned berries show the rust more conspicuously than black ones; and some varieties, such as Mrs. Pearson, are more liable to it than others.

Prevention and Remedy.—When once the berries have become discoloured there is no remedy beyond cutting out the injured berries, or the worst of them, so as to improve the appearance of the remainder. When the berries are being thinned, care should be taken to avoid touching them with the hands, the hair of the head, or even with the scissors. Other likely causes are checks to growth by a sudden fall in the temperature of the house, or by cold draughts playing upon the berries at this critical period of their growth. It is significant that rust is usually most prevalent in early houses where much artificial heat is used at a time when great fluctuations of and low temperatures outside are prevalent. Avoid over-heating of hot-water pipes, and use the syringe freely to keep down red spider rather than resort to the sulphuring of the pipes at this stage of growth.

Other Kinds of Rust.—Modern gardeners apply the term "rust" to the Uredo stage of various fungi parasitic on cultivated plants, the term referring to the rusty or orange colour of the spores. The rust of wheat is Puccinia Graminis, the Puccinia being the last stage of the life cycle, bearing black or brown spores, termed teleutospores, which are one- to two-celled in P. Graminis, thick-skinned, and hibernate till spring. The rust of Roses is Phragmidium mucronatum, or Rat's tail fungus, from the fact that the teleutospore is many-celled and ends in a point. The final stage of many species of rust is unknown, so that the Uredospore or rust stage is the more conspicuous, as it is the more known, upon cultivated plants. As the older botanists looked upon Uredo as a distinct genus of fungi, many species are recorded under that name, upon the Primrose, Bean, Mint, Willow, Rose, Bramble, Flax, Saxifrage, Campanula, Pyrola, Cerastium, Petasites, Poplar, and other garden plants. One of the most serious invasions is that of Chrysanthemum Rust (*see* Puccinia Hieracii). The Cluster Cup (Æcidium) is an earlier stage than Uredo, and many garden plants, including the leaves and fruit of the Gooseberry, are affected; also the Carnation by Uredo Dianthi and Helmin-

Rupala (*see Roupala*).
Rush (*see Juncus*).
Rush Broom (*see Viminaria and Spartium junceum*).
Rush Fern (*see Schizæa*).
Rush, Flowering (*see Butomus*).
Rush Lily (*see Sisyrinchium and Aphyllanthes*).

thosporium echinulatum; and the Hollyhock by Puccinia Malvacearum, etc. (For remedies, *see* under the respective plants attacked, and also PUCCINIA.)

RUSTIC ORNAMENTS AND STRUCTURES.

Most gardens contain some rustic designs, either for use or ornament, and even the smaller gardens, including those attached to villas, may have their rustic chair, seat, or summerhouse. In the wilder or more unkempt parts of large gardens and pleasure grounds, rustic seats at convenient distances apart, in suitable places commanding fine views, and under the shade of large trees, are very desirable objects. Where streams, either natural or artificial, run through the grounds, rustic bridges are often very effective as well as useful. At a distance from the dwelling house the wood used in constructing these bridges may be rough, as hewn in the wood or copse, and left uncovered or used to support flowering and other ornamental climbers according to desire or taste. The wood used is generally of Oak, Hazel, or Larch, because it is durable, and the pieces may be straight, crooked, twisted, knotted, or interlaced in various ways. A gardener of skill and taste in these things can often construct bridges, seats, chairs, and houses of great beauty and utility. The houses may be thatched with wheaten straw internally and externally, but Ling (Calluna) or Heather makes a more durable outer covering. The sides or railings of the bridges and the sides of summerhouses, between the supporting posts, may be panelled in a variety of ways with fine effect.

In the more immediate neighbourhood of the dwelling house, and in well-kept parts of the garden, rustic work is more in keeping with its surroundings if the wood of which it is constructed is peeled and varnished so as to look neater and preserve it from decay. Barked wood forms less harbour for earwigs, ants, and other undesirable insects.

Fences and Vases. — Ornamental and highly desirable fences, either by themselves as screens, etc., or as supports for climbing plants, may be made of Oak, Hazel, or other shoots, crossing one another to form squares, or diagonally to form lozenge shaped meshes. They may also be twisted to form any other design according to the will of the operator. Rustic vases made of wood, and the sides panelled with rods, may be made highly ornamental when filled with Fuchsias, Pelargoniums, and other flowering plants in summer. Pillars, arches, and other designs make suitable supports for Roses, Clematises, and other climbers.

RUTA. (RUE.)

Hardy herbs (*ord.* Rutaceæ), for the herbaceous border or rockwork. Graveolens is much grown as a potherb under the name of Rue, and makes a beautiful, low partition hedge in the kitchen garden. Propagation, by seeds in spring; also by cuttings in sandy soil under a frame or handlight in summer, shaded till rooted. Any well-drained garden soil will do, but if heavy some leaves, sand, and mortar rubbish may be mixed with it.

Principal Species :—

chalepensis, 2′, sum., yel. (*syn.* angustifolia).
graveolens, 2′ to 3′, sum., yellowish grn. (*syns.* altera, ciliata, crithmifolia, divaricata, hortensis, etc.).
— variegata, lvs. with wh. blotches.
patavina, 1′, Je., yellowish grn.; the best rockery plant (*syn.* Buxbaumii of Frivald).
suaveolens, 2′, sum., yel. (*syns.* Biebersteinii and linifolia grandiflora of *Botanical Magazine*).

Other Species :—

albiflora, 2′, aut., greenish wh. (correctly Bœninghausenia albiflora).
linifolia, 2′, Sep., yel.
macrophylla, 2′ to 3′, sum., yellowish (*syn.* bracteosa).

RUYSCHIA (*syn.* SOUROUBEA).

Stove, evergreen shrubs (*ord.* Ternstrœmiaceæ), allied to Marcgravia. Propagation, by cuttings in sand in a close case. Soil, fibrous loam, with a third of peat and leaf mould, and plenty of sand. Most of them are suitable for climbing up tree stems.

Principal Species :—

clusiæfolia, 4′ to 6′, My., pur. (*syns.* fragrans and laurifolia).
Souroubea, 6′ to 8′, (*syns.* guianensis and Surubea).

RYANIA (*syn.* PATRISIA).

A small genus of stove, evergreen shrubs or trees (*ord.* Bixineæ), with solitary or clustered and generally showy flowers. Propagation, by cuttings of mature shoots in sand, in a close case. Soil, fibrous loam and peat in equal proportions, with sand. Speciosa, 10′, August, cream (*syns.* tomentosa and Patrisia pyrifera) is the only one in cultivation.

RYSSOPTERYS.

A small genus of twining stove shrubs (*ord.* Malpighiaceæ), with terminal heads of whitish flowers. Propagation, by cuttings of side shoots getting firm, in sand, in a close case. Soil, fibrous loam and a third of peat, with sand. Microstema, August, white, is the only species introduced.

SABAL.

Greenhouse or stove Palms (*ord.* Palmæ), some of which grow to a height of 80′, others being almost, or quite, stemless. The larger growing species are most often met with. They are seen at their best when planted in a border, or grown in very large tubs or pots. The leaves of several species are put to economic uses, those of blackburniana being used for thatch, and those of Palmetto being sometimes used by the natives of the Southern States of North America for hat and mat making. Propagation, by imported seeds. Soil, loam, with an addition of grit.

Principal Species :—

Adansoni, lvs. 2′ to 3′, divided into twenty or more divisions, grh., stem below ground. Dwarf Palmetto.
blackburniana, 20′ to 25′, lvs. 4′ to 5′ across, warm grh., margins divided into seventy or more segments (*syn.* umbraculifera of Martius). Fan or Thatch Palm.
Palmetto, 30′ to 40′, grh., lvs. 5′ to 8′ long, 6′ to 7′ wide. Cabbage Palmetto, Palmetto Palm.

Other Species :—

cœrulescens, dwarf, lvs. with glaucous hue.
filamentosa, 4′ or more, lvs. with thread-like filaments.
glaucescens, lvs. glaucous.
major, small plants only in cultivation.
mauritiæformis, 60′, lvs. 5′.
mexicana, 20′, lvs. 4′.
minor (*see* Adansoni).

Rymia (*see Euclea*).
Rytidophyllum (*see Rhytidophyllum*).

SABBATIA (*syns.* LAPITHEA and NEUROLA).

A genus of annual or biennial hardy, erect-growing herbs (*ord.* Gentianeæ), principally from North America, and mostly of considerable beauty for moist places or artificial bogs. Propagation, by seeds, sown in pans or pots of light soil, and allowed to stand in water under glass. Soil, moist and peaty. Campestris and paniculata do in dry ground also.

Principal Species :—

calycosa, 5″ to 20″, sum., wh.
campestris, 6″ to 15″, sum., ro. (*syn.* formosa).

Other Species :—

angularis, 1′ to 2′, Jy., rosy pk. or wh.
chloroides, 1′ to 2′, sum., ro. or wh.
corymbosa, 1′ to 3′, sum., wh. (*syns.* lanceolata and cymosa).
Elliottii, 1′ to 2′, Jy., wh.
paniculata, 1′ to 2½′, sum., wh. (Pursch, not Ell.).
stellaris, 6″ to 24″, sum., ro., pur., or wh. (*syn.* amœna).

SABICEA.

Stove climbing shrubs (*ord.* Rubiaceæ). Propagation, by cuttings in heat. Soil, fibrous peat and loam, equal parts, with a good dash of sand.

Principal Species :—

aspera, 6′, Je., wh.
— hirta, 6′, Je., wh.

SABINEA.

Stove shrubs (*ord.* Leguminosæ) of dwarf habit and ornamental character. The Pea-shaped flowers are produced in racemes. Propagation, by cuttings of young shoots in sandy soil in a warm case. Soil, equal parts of fibrous peat and loam, with a liberal addition of sand.

Principal Species :—

cardinalis, 3′, sum., sc.
florida, 3′ to 4′, sum., pk.

SACCHARUM.

Tall-growing stove Grasses (*ord.* Gramineæ), the most important of which is officinarum, the Sugar Cane. Several are of decidedly ornamental appearance, and are occasionally met with in collections of stove plants, but generally speaking they are little used by the gardener.

Principal Species :—

officinarum, 10′, Jy., wh.
— violaceum, stems vio.
spontaneum, 7′ to 9′, flowers wh. in large plumes (*syn* ægyptiacum).

SACCIA.

One species only of these stove plants (*ord.* Convolvulaceæ) is known. Elegans forms an ornamental bush from 3′ to 6′ high, and bears lilac flowers in racemes in summer. Propagation, by cuttings in summer. Soil, loam and leaf mould.

SACCOLABIUM.

Description.—Dwarf, epiphytal Orchids (*ord.* Orchidaceæ) of considerable beauty. The smallness of the flowers cannot be regarded as a disadvantage, as they are usually borne in great profusion on long racemes, which look quite out of proportion to the size of the plant. In addition, the flowers are fragrant and exquisitely coloured.

Propagation.—Imported plants are almost solely relied on to keep up or increase a stock.

Culture.—The warmest house is the proper place in which to grow Saccolabiums, as they rejoice in plenty of heat, moisture, and sun. They should be grown in Teak baskets suspended from the roof and exposed to full sun, except for a light shading given for a few hours at midday in very hot weather. The temperature throughout the growing season—end of February to end of September—should be 75° to 85° during the day, varying according to the weather, with a drop of 5° during the night. In winter the temperature may be allowed to fall to 65° in the day and 60° at night. At the commencement of the growing season, which is heralded by tiny green points appearing on the roots, any rebasketing or surfacing necessary should be attended to. The compost should consist of pieces of charcoal and clean crocks, with small lumps of clean peat fibre, and a good proportion of living sphagnum moss near the surface. Care must be taken not to damage any of the young roots during the process. Abundance of water at the roots is required, keeping the plants a little drier in the winter.

Principal Species and Varieties :—

ampullaceum, 8″, sum., magenta ro.
bellinum, 6″ to 8″, spr., grn., br. blotches, lip yel., wh., dotted mauve.
curvifolium, 6″, sum., or., sc.
giganteum, 1′ to 1½′, win., wh., spotted pur., lip pur.
— illustre, richer colour.
hendersonianum, 4″, spr., rosy red, lip wh.
longicalcaratum, 6″ to 8″, sum., pk., pur.
miniatum, 4″, spr., or., red.
violaceum, 1′ to 1½′, Jan., wh., spotted mauve, lip dark mauve.
— harrisonianum, ivory wh. (*syn.* harrisonianum).

Other Species :—

Blumei (*see* Rhynchostylis retusa).
calceolare, 6′, spr., yel., red spots.
cœleste (*see* Rhynchostylis cœlestis).
gemmatum, 6″, My., pur.
guttatum (*see* Rhynchostylis retusa).
hainanense, 6″, spr., wh., pur.
micranthum, 4″ to 6″, Jy., vio.
mooreanum, 6″ to 8″, sum., pk., grn. tips.
Pechei, 6″, Ap., ochre, with red spots.
præmorsum (*see* Rhynchostylis retusa).
retusum (*see* Rhynchostylis retusa).
wightianum (now Aërides radicosum).

SADLERIA.

Stove Ferns (*ord.* Filices) of dwarf, tree-like habit and with handsome fronds. Cyatheoides is the only cultivated species. It grows several feet in height, and forms a fine head of fronds each of which on well-grown plants averages from 5′ to 6′ in length by 1½′ in width. Propagation, by spores in the usual way. Other details of culture are similar to those recommended for stove Ferns.

SAGE.

The common Sage (Salvia officinalis), although classed as a "herb," is really a dwarf under-shrub. Bushes will flourish for an almost indefinite period. Propagation, by cuttings of the growing points, in

Saccoloma (*see Davallia*).
Sacred Bean (*see Nelumbium speciosum and Nymphæa Lotus*).
Saddle Tree (*see Liriodendron tulipifera*).
Sad Tree (*see Nyctanthes Arbor-tristis*).
Safflower (*see Carthamus*).
Saffron (*see Crocus sativus*).
Saffron, Meadow (*see Colchicum*).
Saffron Thistle (*see Carthamus*).
Sage, Jerusalem (*see Phlomis fruticosa*).
Sagenia (*see Nephrodium*).
Sage of Bethlehem (*see Pulmonaria officinalis*).

early summer, rooted in a cold frame in sandy soil. "Slips" are a favourite method of increase, and seeds are also available. Soil, light, rather dry loam in a warm corner. In making plantations at least 1′ should be allowed each way. An annual top-dressing of farmyard dung is very helpful.

SAGERETIA.

A shrubby genus (*ord.* Rhamneæ) of little horticultural worth. Propagation, by seeds or cuttings. Any ordinary potting mixture.

Principal Species :—

brandrethiana, 4′, sum., grh., grn.

SAGINA.

Annual or perennial herbs (*ord.* Caryophylleæ), chiefly weeds. One or two species make dwarf, compact masses, and are sometimes used for edging purposes. The golden-leaved variety of subulata is a pretty dwarf plant of value for carpet bedding. For this purpose old plants should be divided into small pieces, and planted in cold frames in autumn, where they will remain until required for bedding purposes. If a cold frame cannot be given, a warm, fairly dry border will do.

Principal Species :—

procumbens, 2″, sum., wh. ; useful for carpet bedding.
subulata, 2″, sum., wh. (*syn.* Spergula pilifera).
— aurea, lvs. golden.

Sage Rose (*see Cistus*).
Sago Palm (*see Metroxylon*).

SAGITTARIA.

An ornamental genus (*ord.* Alismaceæ) of hardy or tender perennial herbs, suitable for the margins of ponds, or for tanks or pools indoors. The leaves are without exception arrowhead shaped and usually of ornamental presence. The most familiar example is the Common Arrowhead, sagittifolia, of our British pools. Where not found growing naturally it is worth introducing to make variety among the other things found fringing the margins of lakes and pools. Propagation, by means of seeds sown as soon as ripe, or by division in spring, summer, or autumn. Soil, rich, marshy ground—if covered with a few inches of water, so much the better—for hardy species; good, rich loam, used either in pots or beds, for the tender ones. Outside many are fast growers, and require constant thinning to keep them from overcrowding other things.

Saintpaulia ionantha (*see p.* 300).

Principal Species :—

heterophylla, 2′ to 3′, sum., hdy., wh.
japonica (*see* sagittifolia double var.).
lancifolia, 2′ to 5′, Je., grh., wh.
montevidensis, 3′, sum., wh., crim. spots.
natans, 1′, Jy., wh.
sagittifolia, 1′ to 2′, sum., wh. There is a fine double var.

Other Species :—

acutifolia of Pursch (*see* graminea).
angustifolia (*see* lancifolia).
doniana (*see* sagittifolia).
falcata (*see* lancifolia).
graminea, 1′, Je., st., wh.
hastata, 1½′, Jy., grh., wh.
latifolia (*see* sagittifolia).
obtusa (*see* sagittifolia).
rigida, 1½′, Je., hdy., wh.

SAGRÆA.

Stove shrubs (*ord.* Melastomaceæ), of little horticultural value. Propagation, by cuttings in sandy soil. Soil, equal parts of fibrous peat and loam, with a good addition of silver sand.

Principal Species :—

hirsuta, 6′, My., wh. (correctly Ossæa hirsuta).
pilosa, 4′ to 5′, sum., wh., fruit red.
sessiliflora, 4′, Ap., red.
umbrosa, 6′, Mch., red.

ST. MARK'S FLY.

A popular name applied to a common fly from its usually appearing about St. Mark's Day. The males are small and black, the females small and yellowish. Its eggs are sometimes deposited about meadows or corn fields, and the larvæ often do considerable damage by eating the roots of Grass and Corn. Birds do more real good in checking the pest than anything else.

Photo: Cassell & Company, Ltd.

SALIX BABYLONICA (*see p.* 301).

SAINTPAULIA.

A small genus (*ord.* Gesneraceæ), of which one species only is in cultivation. Ionantha is one of the loveliest of the newer warm house plants. The flowers are borne about the end of summer in great profusion. By a little attention to cultivation batches may be had in flower at several different times. Propagation, by leaf cuttings. These may be taken at almost any season, and dibbled into boxes or pans of equal parts sand and Cocoanut fibre refuse, in a warm case, keeping them moist, but not saturated. Soil, a light, rich mixture of equal parts of fibrous loam and leaf mould, with a good quantity of sand. When well rooted the leaves should be potted up singly, and kept in a minimum temperature of 55°. As soon as a number of young leaves have been made, and root action is advanced, good supplies of water will be necessary, taking care not to let the water lie on the leaves long enough to cause them to decay. When the first pots are full of roots a shift should be given into 5″, which will be large enough for flowering. When flowers begin to appear, a cooler and more airy house should be provided. Saintpaulias may be used with advantage as border plants, providing the border is well drained and the soil light. They do remarkably well in a warm greenhouse.

Only Species and its Varieties :—

ionantha, 4″, sum., aut., vio. (*see p.* 299).
— albescens, wh.
— purpurea, pur.
— violescens, deep vio.

Sagus (*see Metroxylon*).
Sainfoin (*see Onobrychis sativa*).
St. Andrew's Cross (*Ascyrum Crux Andreæ*).
St. Barbara's Herb (*Barbarea vulgaris*).
St. Barnaby's Thistle (*see Centaurea*).
St. Bernard's Lily (*see Anthericum Liliago*).
St. Bruno's Lily (*Paradisea Liliastrum*).
St. Dabeoc's Heath (*see Daboëcia polifolia*).
St. George's Herb (*see Valeriana officinalis*).
St. John's Bread (*see Ceratonia Siliqua*).
St. John's Wort (*see Hypericum and Symphoricarpus vulgaris*).
St. Joseph's Lily (*see Lilium candidum*).
St. Martin's Flower (*see Alstrœmeria pulchra*).
St. Martin's Herb (*see Sauvagesia erecta*).
St. Mary's Wood (*see Calophyllum Inophyllum*).
St. Patrick's Cabbage (*see Saxifraga umbrosa*).
St. Peter's Wort (*see Ascyrum stans, Hypericum Ascyron, Primula officinalis, and Symphoricarpus*).

SALACIA.

Small stove or greenhouse trees and shrubs (*ord.* Celastrineæ). They are of little garden value. Propagation, by cuttings. Soil, fibrous loam.

Principal Species :—

macrophylla, 12′, sum., grn.
Roxburghii, 8′, sum., grn.
scabra, 5′, sum., grn.

SALADING.

The production of good salad plants throughout the whole of the year is one of the greatest taxes on the gardener. In summer it is a comparatively easy matter, as there are a great many things to select from. In winter the choice of subjects is limited, and great care has to be exercised that the plants do not succumb to bad weather. The most popular of all salad plants is the Lettuce, and with a little care it may be had throughout the whole of the year. In winter its close and hardier ally, Endive, is very valuable. This, with Lettuces, should be well blanched before being used. Where a warm framé or house is at hand many things, such as Mustard and Cress, Radishes, and Lettuces, can be obtained at almost any time during winter. Roots of Chicory, Dandelion, and Sorrel, placed in heat and kept in the dark, produce crisp young leaves, which are very useful. The following are some of the most noteworthy subjects, their cultivation being found under the respective headings :—

Beetroot, Celeriac, Celery, Chervil, Chicory, Chives, Corn Salad, Cress (American), Cucumber, Dandelion, Endive, Lettuce, Mustard and Cress, Water Cress, Onion, Purslane, Radish, Rampion, Rape, Sorrel, Tarragon, Tomato.

SALICORNIA. (Glasswort. Marsh Samphire.)

This genus of hardy or tender, annual or perennial, sea coast herbs (*ord.* Chenopodiaceæ) has nothing to recommend it to the notice of the decorative gardener. Economically the plants are of value, inasmuch as they contain a good deal of soda, and the ashes were at one time much employed, under the name of Barilla, for making glass and soap. Of late years the soda obtained from common salt (sodium chloride) has to a great degree superseded Barilla. Herbacea, the Crab Grass, and radicans are British species.

SALIX. (WILLOW.)

Description.—Hardy deciduous trees and shrubs (*ord.* Salicineæ), generally very quick growing, and of great value for planting in damp situations. In exposed positions where Bamboos will not thrive, the Willow may be used as a good substitute, submitting it to severe pruning every three or four years, to maintain a dwarf character, and to supply a quantity of graceful, long shoots. The Salix is also of much value for planting by the sides of streams, lakes, and ponds, as well as for various positions in the garden generally. The stems of old pollarded Willows furnish light wood for several purposes, whilst "The Willow" is well known to the cricketing world. (For the cultivation of Willows to supply wands for basket making, *see* Osiers.)

Propagation and Soil.—By seeds, cuttings, suckers, layers, budding, and grafting. Seed should be sown as soon as it is ripe, as it quickly loses its vitality. Cuttings may be of any length from 1′ to 6′, and of any size, and may be inserted at any time in damp soil. The weeping forms should be budded or grafted standard high—6′ or 8′—and the shoots thinned and trained in a symmetrical head. Any moist, loamy soil suits. The male plants should be selected in preference to the females, as the catkins are more showy.

[Note.—The species cross so very readily that much confusion of names exists.]

Principal Species and Varieties :—

alba, 50′ to 60′, My. White Willow.
— argentea, silvery (*syns.* alba leucophylla of gardens, argentea, leucophylla, etc.).
— britzensis, young shoots pur. red (*syn.* vitellina britzensis).
— cærulea, lvs. glaucous beneath, shoots olive.
— vitellina, shoots yellowish red (*syn.* vitellina).
— vitellina pendula, weeping.
babylonica, 30′, My. (*syns.* pendula, japonica, neapolitana, perpendens, riparia, etc.). Babylonian or Weeping Willow (*see p.* 300).
— annularis, lvs. twisted (*syns.* annularis and crispa).
Caprea, 20′, Mch., silvery. Common Sallow, Goat Willow.
— pendula, weeping; one of the best. Kilmarnock Willow.
elegantissima, branches pendent, like babylonica (*syn.* americana pendula).
fragilis, 60′ to 80′, Apr., shoots yellowish br., shining (many *syns.*: bigemmis, cerasifera, conformis, mascula, etc.).
— blasfordiana, bright or. red shoots (*syns.* basfordiana and sanguinea).
— decipiens, shoots or. red.
gracilistyla, lvs. broad, prominent buds, handsome.
lanata, 10′, sum., wh., lvs. silky, good for shrubbery (*syns.* chrysantha and lanuginosa).
— Sadleri (*syn.* Sadleri).
phylicifolia, 8′ to 10′, Apr., branches red, shining; many vars. Tea-leaved Willow.
purpurea, 10′, Mch., bark reddish pur. (*syns.* carniolica, fissa, fuscata, monarda, and rosmarinifolia of gardens, not Linn.). Purple Osier.
— pendula, weeping; good for poor soil and exposed places.
— scharfenbergensis, superior to pendula.
rosmarinifolia of Linn., 4′, Apr., graceful shr. (*syns.* angustifolia, Arbuscula, cæsia, canaliculata, integra, littoralis, etc.).
vitellina (*see* alba var.).

Other Species, Varieties, and Hybrids :—

acutifolia (*see* daphnoides var.).
ambigua, 1′ to 4′, spr., procumbent.
amygdalina (*see* triandra var.).
blanda, weeping; hybrid (babylonica × fragilis).
candida, 2′ to 5′, shoots red, lvs. web-like, woolly hair.
chlorophylla, dwarf spreading bush.
cinerea, near Caprea (*syns.* acuminata, Dumetorum, oleifolia, polymorpha, and rufinervis). Also vars. aquatica, Medemii, and tricolor.
daphnoides, 20′, Ap., twigs vio. (*syns.* Aglaia of gardens, bigemmis of Hoff., glauca, jaspidea, præcox, etc.). Violet Willow.
— acutifolia, lvs. narrower.
discolor, 4′ to 10′, young lvs. red.
herbacea, 2″, sum., trailing.
incana, 10′, spr., lvs. woolly beneath.
Nicholsoni purpurascens, young lvs. pur., probably a hybrid.
nigra, 10′ to 30′, sum., bark rough, bl.
pentandra, 20′ to 25′, sum. Bay-leaved Willow.
petiolaris, 3′, Ap.
rubra, hybrid (purpurea × viminalis).
— Helix. Rose Willow.
sanguinea (*see* fragilis basfordiana).
smithiana, 6′ to 20′, spr., lvs. grn., wh. beneath.
triandra, 20′ to 30′, sum. French Willow. Amygdalina, Almond-leaved, and hoffmanniana are vars.

Salad Burnet (*see Poterium Sanguisorba*).
Salep (*see Orchis*).
Salisburia (*see Ginkgo*).
Salisia (*of Lindley, see Kunzea*).
Salisia (*of Regel, see Gloxinia*).

SALMEA.

Stove shrubs (*ord.* Compositæ), rarely seen in cultivation. Propagation, by cuttings in summer. Loamy soil.

Principal Species :—

Eupatoria, 5′, Ap., wh. (*syns.* grandiceps and scandens).
hirsuta, 6′, Aug., yel.

SALPICHROA.

A genus of stove or greenhouse shrubs, sub-shrubs, or herbs (*ord.* Solanaceæ). Propagation, by cuttings or seeds in spring, in a mixture of sandy loam and leaf mould. Soil, rich, fibrous loam and sand.

Principal Species :—

glandulosa, 2′, Jy., grh., yel.

SALPIGLOSSIS.

Description.—A genus of annual, biennial, and occasionally perennial herbs (*ord.* Solanaceæ), very ornamental and of considerable merit. The species most commonly used in gardens are sinuata and linearis; they are of service either for outdoor borders or for growing in pots for the conservatory.

Propagation.—By seeds, sown in gentle heat in autumn or spring, the seedlings being pricked out into pans or boxes as soon as large enough to handle. For growing in pots, a few seeds may be sown in a 6″ pot, and the seedlings thinned down to six, and left otherwise undisturbed.

Soil.—For outdoor culture, any ordinary garden soil; for indoors, fibrous loam, leaf mould, and rotted manure.

Other Cultural Points.—When growing in borders, a space of 1′ should be left between the plants, especially when the soil is rich. Copious waterings must be given in dry weather. When for pot culture, a cool, airy house, and a position near the glass, should be provided. Liquid manure will be found necessary when the pots become filled with roots. The flowering period may be prolonged by growing in batches, sowing the seeds at intervals of a month. More flowers are also produced by removing the old blooms as they fade.

Principal Species and Variety :—

linearis, 1′, Aug., hlf-hdy. per., pur., yel. (*syn.* Petunia intermedia).
— grandiflora, large, various colours.
sinuata, 2′, sum., hdy. ann., many beautiful vars. (*syns.* variabilis and picta).

SALSAFY or SALSIFY.

The common name for Tragopogon porrifolium (*ord.* Compositæ), a hardy biennial with a thick, white, Carrot-like root, long, Grass-like leaves, and purple flowers. It is cultivated in gardens for the sake of its roots, which are used as a vegetable. Seeds should be sown in March or April, in drills 1′ apart, in ground which has been previously trenched 1½′ or 2′ deep. When the seedlings are large enough to handle they should be thinned to 6″ apart. The ground throughout the summer should be well cultivated by hoeing and keeping it clear of weeds. The roots will be ready for lifting in early autumn, and may be stored in a similar way to Carrots.

Sallow (*see Salix*).
Sallow Thorn (*see Hippophae*).
Salmon Berry (*see Rubus spectabilis*).
Salpichlæna (*see Blechnum and Lomaria*).
Salpixantha (*see Geissomeria*).

SALSOLA. (Alicant Soda. Saltwort.)

These hardy herbs and shrubs (*ord.* Chenopodiaceæ) have no garden value, but the ashes of several species, notably the British Kali and the American Soda, were at one time used for soap and glass making. With the ashes of the Salicornia they were known as Barilla. *See* also Salicornia.

SALTS.

The word salt was at one time used only to describe the common table salt (chloride of sodium), but the chemist has given it a far more comprehensive range of late years. It is now applied to those chemical compounds formed by acids with alkalies. The section of mineral acids is probably the most important to the gardener, for it includes sulphurous, sulphuric, nitrous, nitric, muriatic, and carbonic acids, and these are frequently component parts of the chemical manures which have so large a vogue with the scientific gardener.

The salts are named according to the acids which they contain. Thus all those compounds which have their acid portion represented by sulphuric acid are called sulphates; those with nitric acid, nitrates; with carbonic acid, carbonates; and with phosphoric acid, phosphates. Occasionally an adjectival ending is given to the word expressing the base of the salt, and the compound is known thus, as, for instance, in the expression "ammoniacal salts."

Where the acids are not fully oxygenated, as in sulphur*ous* and phosphor*ous* acids, the corresponding salts take the ending "ite" instead of "ate," *e.g.* sulphite of lime, instead of sulphate of lime. Again, when a salt contains an excess of acid the prefix "super" is attached, *e.g.* superphosphate of lime. When there is not enough of the acid present to thoroughly saturate the base, "sub" is affixed, *e.g.* sub-borate of soda.

Chloride of sodium occurs in varying quantities in the ash of plants, but experiments have fully demonstrated that although present it is not an essential to any plant. Salt is frequently used as a manure, and has been found to suit Beetroot, Asparagus, and other seaside plants, while when applied to Mangold Wurzels an increased weight of crop has resulted. On light, hungry soils it is of the most service, but it would be a mistake to apply it to heavy, clayey soils. It reduces nitrogenous substances already in the soil, as well as those contained in chemical and organic manures, into a condition available for plant food. Common salt is occasionally used as a weed killer for gravel paths, but its use is not to be recommended, as it makes the paths damp. Salts of iron are occasionally recommended by manurial experts, but their application must be carried out with the greatest caution. It is true that iron is needed by the plant to perfect the formation of chlorophyll, but iron is present in sufficient quantities in most soils. A slight excess is injurious.

Phosphate of potash supplies both potash and phosphoric acid, and is a very valuable manure, although not a forcing one, as is the case with the specially concentrated nitrogenous fertilisers. Unfortunately it is at present rather expensive.

It should be remembered, when applying these saline compounds, that they all have a great affinity for water. If, then, they are present in quantity in close proximity to the delicate root hairs of plants, and there be not abundance of

moisture in the soil, they are apt to draw the moisture from the roots. In dry seasons, therefore, the application of concentrated saline fertilisers is either inoperative or positively injurious unless water is also given. (*See also* ARTIFICIALS and MANURES.)

SALVADORA.

Evergreen stove trees and shrubs (*ord.* Salvadoraceæ), with racemes of small, whitish flowers. Propagation, by cuttings. Soil, fibrous loam.

Principal Species :—

persica, 12′, Je., wh. (*syns.* indica and wightiana). Mustard Tree, Kiknel Oil Plant.

SALVIA.

Description.—Upwards of 450 species of this genus (*ord.* Labiatæ) have been described, and a large number are of considerable garden merit. The species are for the most part annual, biennial, or perennial herbs or sub-shrubs, and are either stove, greenhouse, or hardy subjects. For the herbaceous border several make excellent plants, particularly patens with its rich blue flowers. As a potherb officinalis, the Common Sage, is most useful, and the greenhouse species are very ornamental. Although most of the indoor species are perennials, they are best treated as annuals.

Propagation. — By seeds or by cuttings for the majority. Most of the indoor species should be propagated by means of cuttings in February and March, but splendens is improved by being raised from seed annually. Cuttings should be inserted in sandy soil, and placed in a warm case ; seeds should be sown under similar conditions.

Soil.—Rich loam should form the principal part of the compost, adding thoroughly decayed natural or some artificial manure at the time of potting. The most suitable of all composts for indoor species is the one recommended for bush Chrysanthemums. Outdoor plants thrive in any rich soil.

Other Cultural Points.—Plants must never be allowed to starve for want of larger pots, frequent repotting being necessary until the flowering size, which may be anything from 6″ to 10″, is reached. After this, manure water in quantity will be required. For the first few months frequent pinching out of the points will be necessary to form sturdy plants ; especially is this the case with splendens, coccinea, etc. Throughout summer they may be grown out of doors. About London, Salvias are sometimes affected by fogs ; the best method to adopt in foggy weather is to keep the plants fairly dry and cool. Patens should, especially in cold districts, be lifted and stored in a cool place for winter. In spring it may be started indoors, and be planted out in May.

Principal Species and Varieties :—

azurea, 6′ to 8′, Aug. to Feb., grh., bl.
coccinea, 3′, Aug., grh., sc.
fulgens, 3′, sum., grh., red.
Heerii, 3′, win., grh., sc.
involucrata, 4′, Aug., grh. or hlf-hdy., ro.
— Bethelli, rosy crim.
leucantha, 3′, win., grh., wh.
officinalis, 2′, sum., hdy., pur. Sage.
— tricolor, superior to type.
patens, 2½′, sum., bl.
— alba, wh.
splendens, 3′, Aug. to Jan., grh., sc.
— Bruantii, very fine.
— compacta, dwarf.
— grandiflora, very large.
— Silver Spot, lvs. spotted with silver.

Other Species and Varieties :—

Æthiopis, 3′, My., hdy., wh.
angustifolia, 2′, My., hdy., bl.
argentea, 3′, Je., hdy. bien., pk., wh.
aurea, 3′, spr., grh., yel.
bicolor, 2′, Je., hdy., red, wh.
cacaliæfolia, 3′, Je., grh., bl.
canescens, 2′, Jy., hdy., pur.
gesneræflora, 3′, Mch., grh., sc.
glutinosa, 3′, Jy., hdy., yel.
Grahami, 4′, Sep., grh., sc.
hians, 1′, Je., hdy., bl.
Horminum, 1½′, Je., ann., pur.
— bracteis violaceis.
interrupta, 3′, Je., hdy., yel.
lyrata, 1′, Je., hdy., pur.
nutans, 2′, Jy., hdy., vio.
petiolaris, 3′, aut., grh., red.
pratensis, 4′, My., hdy., vio.
— alba, wh.
— rosea, ro.
rutilans, 3′, win., grh., red.
scapiformis, 2′, My., grh., bl.
sylvestris, 2′, Aug., hdy., pur., vio.
tiliæfolia, 4′, My., hdy., bl.
virgata, 4′, Sep., hdy., wh.
viscosa, 1½′, My., hdy., vio.

SALVINIA.

A pretty little plant (*ord.* Salviniaceæ), suitable for stove or greenhouse. It grows and floats on water in a similar manner to Azolla and Lemna, and, like those plants, increases very rapidly in summer. It is closely allied to Ferns. Propagation, by spores. The mature plants are made up of slender stems clothed with small, Fern-like leaves. No roots are to be found, the leaves on the under side of the stem performing the root functions. From between these leaves the spore cases are developed. Natans, the only species, is an annual, and to keep it a number of plants should be placed in a pan of water, which has previously been half filled with loam, in autumn. The spores will fall on the loam as the old plants die, and will commence growing in spring.

SAMBUCUS.

Description.—Hardy trees, shrubs, and herbaceous plants (*ord.* Caprifoliaceæ). About a dozen species and a large number of varieties are known, of which the majority are in cultivation. The common Elderberry, S. nigra, is the most familiar example. It is a British plant, easily recognised by its coarse, pinnate leaves, large, flattened heads of white flowers, richly coloured black fruits, and pungent smell. The flowers and fruit are largely used in some places for wine, and extracts of the leaves, stem, flowers, and fruits are utilised in the preparation of many home made medicines. The value of the species from an ornamental point of view is quite overshadowed by its golden-leaved varieties, and by other species and varieties. Racemosa differs from other species by having its flowers and fruits in branched racemes. The fruit of this is bright red, and extremely ornamental. In some parts of Switzerland it is said to be one of the most ornamental bushes imaginable when covered with fruit ; unfortunately, birds are very fond of the fruit, and it is difficult to get it at its best here.

Propagation.—By cuttings of ripened shoots 1′ long, inserted in rows 1′ apart in the open air ; 1″ or 2″ will be found sufficient space between the cuttings.

Salt Tree (*see Halimodendron*).
Saltwort, Black (*see Glaux*).
Samara (*of Swartz, see Myrsine*).

Soil.—Good loamy soil is most suitable, but that of a sandy nature will do.

Other Cultural Points.—The golden and variegated varieties are improved by thinning and pruning annually, the colour of the leaves being better on young shoots. Both in these and the finely cut-leaved varieties young plants are preferable to old. Although the place for most Elderberries is the shrubbery, a few of the best of the varieties make handsome beds or groups for conspicuous places.

Principal Species and Varieties :—

nigra, 20′ to 25′, Je., wh. Common Elder.
— foliis aureis, lvs. golden.
— laciniata, lvs. deeply cut.
racemosa, 15′, Je., wh., fruit red (*syns.* sieboldiana and Williamsii).
— laciniata, lvs. prettily cut.
— plumosa, lvs. elegant plume-like.
— plumosa aurea, lvs. golden.
— pubescens, lvs. hairy.
— spectabilis, flower heads large.
— tenuifolia, lvs. finely cut.

Other Species and Hybrid :—

canadensis, 6′, Jy., wh., fruit bl.
Ebulus, 3′, Jy., herbaceous, wh., pk. Dane's Blood, Dane Weed, etc.
glauca, 4′, Jy., wh. (*syn.* californica).
melanocarpa, 8′, Je., wh.
mexicana, 4′, sum., wh.
nigra, vars. aureo-marginata, aureo-variegata, flore-pleno, flore-roseo-pleno, foliis tricoloris, heterophylla, leucocarpa, fructu albo-pellucida, and lutescens swindonensis.
pubens maxima, large flower heads, often 1′ across, Aug.; hybrid (glauca × canadensis ?).
racemosa, vars. dahurica, ornata, ovata, pteridifolia, rosæflora, serratifolia, and Thunbergii.

SAMOLUS.

Herbaceous perennials (*ord.* Primulaceæ), for the most part hardy. Propagation, by division in spring. Any good garden soil.

Principal Species :—

repens, 6″, Aug., wh.
Valerandi, 9″, sum., wh.

SAMYDA.

Greenhouse shrubs, with white, pink, or greenish flowers (*ord.* Samydaceæ). Propagation, by cuttings of half-ripe shoots in July. Soil, equal parts of fibrous loam and peat. They are of little use horticulturally

Principal Species :—

glabrata, 5′ to 12′, sum., wh.
serrulata, 4′, sum., wh. or ro.

SANCHEZIA.

A genus of sub-shrubby stove plants (*ord.* Acanthaceæ). Propagation, by cuttings at any time. Soil, sandy loam and peat. Pot or border culture can be practised. A variety with golden variegated leaves is in cultivation, and forms a handsome plant. (*See also* ANCYLOGYNE.)

Principal Species :—

nobilis, 1′ to 2′, spr. to win., yel., bracts bright red.

SAND.

This is indispensable in the garden for lightening and draining soils. For pot work silver or white sand is generally favoured, and should be used in as coarse a condition as possible. Fine sand is useful as a surface for cutting pots, but is of less value for mixing with the soil, as it fails to render it sufficiently porous. Red or common sand may be substituted after the major portion of the iron has been washed away. River and coast sand may also be utilised, though the latter should first be washed and exposed to the weather for a while to get rid of the saline properties.

SANDERSONIA.

A showy, tuberous-rooted stove herb (*ord.* Liliaceæ). Propagation, by seeds. Soil, light loam and peat. It should be given a rest during winter.

Only Species :—

aurantiaca, 1½′, sum., or. yel.

SANDORICUM. (SANDAL TREE.)

Indicum, the only species of note, is a stove tree (*ord.* Meliaceæ), growing 50′ in height, with yellow flowers and acid, Apple shaped, edible fruits. Propagation, by cuttings. Soil, sandy loam.

SANGUINARIA. (PUCCOON, BLOODROOT, BLOODWORT, RED INDIAN PAINT.)

A hardy perennial herb (*ord.* Papaveraceæ), which is much admired in front of the flower borders or in the rock garden. Its pretty white flowers appear just before the leaves unfold. In large clumps it is very effective, and universally admired when in flower. Propagation, by division of the roots, immediately after flowering or in autumn; also by seeds, sown as soon as ripe, or in spring. Soil, light sandy peat. Some prefer a shady place, but it does well in full sun if it receives plenty of water.

Only Species and its Varieties :—

canadensis, 6″, Ap., wh.
— major, larger (*syn.* canadensis grandiflora).
— stenopetala, narrower, but more petals.

SAN JOSÉ SCALE.

This troublesome little pest (Aspidiotus perniciosus) is the most injurious and one of the most difficult of all the scale insects to dislodge. It is a near relative of the Apple Mussel Scale. Happily for British fruit gardens, the San José Scale has not yet made its appearance therein. Brushing affected trees with a stiff brush dipped in kerosene emulsion would probably be effective, although it would be a tedious operation.

SANSEVIERIA (*syns.* ACYNTHA and SALMIA. BOWSTRING HEMP.)

Stove herbaceous perennials (*ord.* Hæmodoraceæ), with thick rhizomes and white or whitish green flowers. They have little to recommend them to the decorative gardener, although interesting and distinct in appearance. Several species are noted for the tough, lasting fibre that they yield. Propagation, by suckers. Soil, sandy soil, with one-sixth of crushed bricks. Very free drainage is needed, and little water in the autumn and winter.

Sambul or Sumbul Plant (*Ferula Sumbul*).
Samphire (*see Crithmum*).

Sandal Wood (*see Santalum*).
Sandal Wood, False (*Ximenia americana*).
Sandy Pear (*Pyrus sinensis*).
Sanguisorba (*see Poterium*)
Sanicle, Bear's Ear (*see Cortusa*).

Principal Species :—

cylindrica, lvs. 3′ to 4′ long, cylindrical, Aug., wh.
guineensis, lvs. 3′ to 4′ high, 2½″ to 5″ broad, grn., spotted wh. Sep., wh. Glauca, latevirens, polyphylla, and zebrina are vars.

Other Species :—

longiflora, lvs. 1′ to 2′ long, 3″ to 4″ broad, wh. spots, Jy., grn., wh.
sub-spicata, Oct., wh., lvs. Kirkii, lvs. 2′ to 9′ long, 3″ broad, mottled reddish br., Feb., wh.
thyrsiflora, 1½′, sum., wh. (*see* figure).
zeylanica, 1′ to 2′ long, ¾″ to 1″ broad, sword shaped, lines wh., red, Sep., grn., wh. Several vars.
pale grn. Does fairly well in grh.
roxburghiana, lvs. 2′ to 2½′ long, 1″ broad, red bordered, Jy., grn., wh.

SANTALUM.

Stove evergreen trees and shrubs (*ord.* Santalaceæ). Album yields the Sandal Wood of India, which is either white or yellow, fragrant when dry, and much favoured as a perfume. It is a rather mysterious plant, which has been declared to be a parasite upon other plants which may be growing near it. This parasitism has, however, been denied in other quarters. The Santalums are rather intractable under cultivation. A sandy loam for soil, and a high degree of heat, are necessary. This is the treatment which is given to them at Kew with good results.

Principal Species :—

album, 15′, My., st., red.
myrtifolium, lvs. narrow.
obtusifolium, 6′, Je., st., red, slender.

Photo: Cassell & Company, Ltd.

SANSEVIERA THYRSIFLORA.

SANTOLINA. (LAVENDER COTTON.)

A small genus of fragrant hardy or half-hardy sub-shrubs (*ord.* Compositæ), with small, yellow flowers and rather attractive foliage. Some of the species are used for carpet bedding, or for forming lines, edgings, or white groundwork for other plants; Chamæcyparissus incana is valued for this. They are generally pretty on rockwork also, and are sometimes grown in mixed borders. Propagation, by cuttings or seeds; also, when large enough, by division. Soil, rather light and dry.

Principal Species and Varieties :—

alpina (now Anthemis montana).
Chamæcyparissus, 1′ to 2′, Jy., yel.
— incana, dwarfer and whiter (*syn.* incana).
— squarrosa, erect grower, flowers small.
— tomentosa, flowers small.
pectinata, 2′, Jy., yel. (Bentham, not Lag.).
rosmarinifolia, 2′, Aug., yel. (*syn.* pectinata, not Bentham).
viridis, 2′, Aug., yel. (*syn.* virens).

SANVITALIA (*syn.* LORENTEA).

A little grown genus of stove or half-hardy annual or perennial herbs (*ord.* Compositæ). Propagation, by seeds. Soil, equal parts sandy loam and peat.

Principal Species and Variety :—

procumbens, Jy., hlf-hdy ann. trailer, yel., disc pur.
— flore pleno, double.

SAP.

The watery fluid found in living plants, enclosed in the cells, and also saturating the cell walls. In its crude form it is practically only the water that has been absorbed from the soil by the root hairs, but which carries with it various dissolved salts, upon which the plant depends for a portion of its food. This crude sap is passed to the leaves, where it is elaborated, and thence back to the various parts of the plants where growth is active. In this form it is commonly spoken of as the elaborated sap. It follows, therefore, that the composition of the sap depends not only upon the kind of plant, but also upon the particular stage of development at which it (the sap) may be.

Rise and Flow of the Sap.—There is a constant flow upwards of crude and a return of elaborated sap throughout the year, for when this ceases the plant dies. The flow is very sluggish in the winter months, with deciduous trees especially. It is true that the sap flow is marked by two periods of greatest activity, characterised by the pushing of new leaf growth, the presence of great quantities of viscous fluid in the cambium, which causes the bark to "lift'

readily, as the gardener phrases it, and the prominent activity of the roots to keep pace with the demands made by the leaves. The regular, constant sap flow is too often forgotten in the observance paid to these periods. The free passage of water from the leaves (transpiration), which causes a movement of the crude sap upwards to supply what has been lost, has also to be reckoned with. The route taken by the ascending sap is through the wood. In many plants it is only the younger layers of wood next the cambium, *i.e.* the sapwood or alburnum, through which the fluid passes. In other cases, as in the Beech, the whole thickness of wood continues to serve as a waterway, and this perhaps until the tree is over 100 years old. The woody fibres, however, do not help in the conduction of water. The descending, or elaborated, sap follows two main routes: (1) through the cellular tissues of the bark, for the dissolved starch and similar compounds, and (2) by the soft bast, for the protoplasmic substances. The practical result of this is that if a ring of bark (inner and outer) be removed, the supply of nourishment to the parts below the wound is cut off. Even if a stout wire ring be bound lightly round a stem, the progress of the elaborated sap is greatly impeded, and there is always a thickened border of tissue above. This obstruction of the descending sap is the principle underlying the common garden operations of ringing and layering, the formation of roots immediately above the wound being the result. It also explains why, if the "tongue" in a Carnation layer be allowed to close, no roots are formed. The periods of the greatest activity of the cambium, or zone of formative tissue, are taken advantage of by the gardener for grafting and budding, the former at the spring and the latter at the late summer flow. Amongst the substances dissolved in the cell sap are such carbo-hydrates as sugar and starch, tannin, citric and malic acids, mineral salts in variety, and a number of colouring agents to flowers and such leaves as those of Dracænas and Crotons.

SAPERDA.

A large genus of beetles, with long antennæ and narrow bodies. They are mostly black in colour, and vary from ⅛″ to 1¼″ in length. The most destructive are those attacking Poplars and Willows, causing gouty swellings on the branches. Cutting of the shoots is the only remedy.

SAPINDUS.

A large genus (*ord.* Sapindaceæ) of stove trees of botanical interest only. Saponaria, the Soap Berry, furnishes a kind of soap in America.

SAPONARIA. (Soapwort. Fuller's Herb.)

A genus of about thirty hardy or half-hardy annual or perennial herbs (*ord.* Caryophylleæ), of which only a few are desirable for the border or rock garden. Calabrica is most useful for beds, groups, or lines, while the forms of ocymoides, which like partial shade, are good rockery plants. The usefulness of the double form of officinalis, which resembles a Lychnis, is decreased by the running habit of the plant, which makes it troublesome in a mixed border. Propagation, the annuals by seeds, sown as recommended for hardy annuals, which *see;* the perennials by seeds, cuttings, or division. Soil, common soil for the greater number, but the Alpines should have loam, peat, and sand, with a little leaf soil in the absence of peat. Guard cæspitosa against slugs.

Principal Species and Varieties :—

calabrica, 6″ to 12″, Aug., hdy. ann., ro.
— alba, wh.
ocymoides, sum., hdy. per. trailer, rosy pur. Rock Soapwort.
— splendens, deep ro.
— splendidissimus, brighter hue, fleshy habit.
officinalis, 1′ to 3′, Aug., hdy. per., pk. or wh. Soapwort, Bouncing Bet, etc.
— flore pleno, double flowers.
— hybrida, pk.

Other Species :—

bellidifolia, 9″, Je., hdy. per., pale yel.
cæspitosa, 6″, Jy., hdy. Alpine per., ro
cerastioides, Je., hlf-hdy. per., wh., ro.
glutinosa, 1½′, Je., hdy. bien., red.
lutea, 6″, Je., hdy. per, yel.
orientalis, 2′, sum, hdy. bien., pk.
pulvinaris, 2″, My., hdy. per., ro.
Vaccaria, 1′ to 2′, Jy., ann., red. Cow Herb.

SAPROPHYTE.

A plant which grows upon decaying animal or vegetable matter. Thus many Fungi are Saprophytes (*see also* Fungi), the common Mushroom being a familiar example.

SARACA (*syn.* Jonesia)

A small genus (*ord.* Leguminosæ) of stove trees and climbing shrubs. Culture as for Brownia, which *see*.

Principal Species :—

declinata, yel., or., lvs. red when young (*syn.* inclinata).
indica, sum., or. (*syn.* Jonesia Asoca of *Botanical Magazine* 3018).

SARACHA (*syns.* Bellinia and Jaltomata).

A few species of greenhouse or hardy herbs (*ord.* Solanaceæ) of comparatively little garden value. Propagation, by seeds, sown outdoors, in spring, in the places where the plants are to flower. Any garden soil.

Principal Species :—

stapelioides, 1½′, sum., hlf-hdy. ann., yel., blotched reddish br.
umbellata, 2′ to 4′, sum., hlf-hdy. ann., grn., wh.

SARCANTHUS.

Stove epiphytal Orchids (*ord.* Orchidaceæ). They are, for the most part, primarily of botanical interest. Propagation, by division and imported pieces. Soil, fibrous peat three parts, sphagnum, chopped, one part, with a little sharp silver sand and a few pieces of charcoal, in Teak baskets hung close to the roof.

Principal Species :—

[Note.—s. = sepals, p. = petals, l. = lip.]

appendiculatus, 1′ to 2′, spr., yel., striped reddish br.
erinaceus, 4″ to 6″, sum., wh., l. ro. (*syns.* Aërides dasypogon and A. rubrum).
filiformis, s. and p. chocolate br., l. yel., pk.
insectifer, 6″ to 15″, sum., s. and. p. yel., striped reddish br., l. wh., rosy pur.
pugioniformis, 9″, yel., red.
teretifolius, s. and p. yel., grn., lined red, l. wh. (*syn.* Vanda teretifolia)
Williamsoni, amethyst.

Sapindus Danura (*Nephelium verticillatum*).
Sapodilla and Sapotilla Plum (*Sapota Achras*).

Sapota (*Sapota Achras*).
Sappan Wood (*Cæsalpinia Sappan*).

Other Species :—

arietinus, grn., l. ro.
chrysomelas, yel., blackish pur.
flexus, s. and p. yel., br., l. with whitish yel. spur.
guttatus (now Rhynchostylis retusa).
hincksianus, close to teretifolius, but flowers smaller and plant more slender.
laxus, dull wh.
paniculatus, yel., s. and p. striped blood red, l. two-horned (*syn.* Aërides paniculatum).
rostratus, s. and p. yel., grn., l. vio

SARCOBATUS (*syn.* FREMONTIA of TORREY. GREASEWOOD.)

One species only, Maximiliani (*syn.* vermiculatus, *ord.* Chenopodiaceæ), of erect-growing, hardy, thorny shrubs, with white, fleshy bark of peculiar appearance. It is of no horticultural value.

SARCOCAPNOS.

Dwarf perennial herbs (*ord.* Papaveraceæ). Enneaphylla, 3″, June, yellow, the only species introduced, is useful for the border or rockery. Propagated by seeds or cuttings. Soil, sandy loam.

SARCOCAULON.

A small genus (*ord.* Geraniaceæ) of greenhouse, branching, fleshy herbs or sub-shrubs from South Africa. They are of curious appearance and interesting, but are not commonly grown. Propagation, by root cuttings, and by cuttings of the young shoots in sand, under a bell-glass. Soil, equal parts of loam, peat, and leaf soil, with about one-eighth of the whole bulk sand.

Principal Species :—

Burmanni, 1′, flowers 1½″ to 2″ across, My., grh., pur.
L'Héritieri, 1′, My., grh., pur., small.
Patersonii, 2′, My., grh., pur.

SARCOCEPHALUS (*syn.* CEPHALINA).

Stove shrubs and trees, occasionally climbers (*ord.* Rubiaceæ). Propagation, by cuttings in sand under a bell-glass, with bottom heat. Soil, loam and peat in equal parts, with one-tenth sand.

Principal Species :—

cordatus, 10′ to 12′, My., yel. (*syn.* Nauclea cordata).
esculentus, 20′, Jy., cl., pk., wh., fruits as large as a Peach. Guinea, Negro, and Sierra Leone Peach.

SARCOCHILUS (*syns.* DENDROCOLLA and THRIXSPERMUM).

Stove epiphytal Orchids (*ord.* Orchidaceæ), with no pseudo-bulbs. Propagation, by imported pieces. Soil, fibrous peat and chopped sphagnum, with crushed crocks, a little sand, and a few pieces of charcoal. A continuously moist atmosphere and a free supply of water at the root are the chief essentials. Shading from strong sunshine is necessary. Hartmannii, Fitzgeraldi, and luniferus may be placed in an intermediate house.

Principal Species :—

[NOTE.—s. = sepals, p. = petals, l. = lip.]

Berkleyi, 3″ to 9″, sum., creamy wh., l. with pur. blotch, drooping.
Fitzgeraldi, sum., s. and p. wh., spotted maroon or ro., l. with yel. front lobe, drooping.
Hartmannii, wh., spotted red (*syn.* Thrixspermum Hartmannii).
luniferus, s. and p. yel., spotted or. red, l. wh., lvs. usually absent; does well on a wood block or raft.
purpureus, 6″, spikes 8″ long, spr., ro., deep ro., crim. (*syn.* Camarotis purpurea).

Other Species :—

Calceolus, wh., s. and p. fleshy.
falcatus, 2″ to 3″, wh., in 3's or 4's.
Freemanii, yel., spotted br., s. long, narrow (*syn.* Thrixspermum Freemanii).
hainanensis, flowers yel., pendent.
ionosmum, yel., blotched br., Violet scented, l. wh., streaked red.
Moorei, yel., spotted br. (*syn.* Thrixspermum Moorei).
muscosus, yel., pur.; dwarf.
pallidus, pale yel. (*syn.* Micropera pallida).
teres, s. and p. wh., spotted pur., fleshy, l. wh., stained vio., pur. (*syn.* Ornitharium striatulum).
unguiculatus, 6″, sum., wh., l. lobes streaked red, front lobe yel.

SARCOCOCCA.

A small genus (*ord.* Euphorbiaceæ) of stove and greenhouse herbs. They are rarely cultivated. Propagation, by cuttings in sand, in a close frame, with bottom heat. Soil, sandy loam.

Principal Species and Varieties :—

pruniformis, 4′, Je., grh., pale yel. (*syn.* saligna).
— coriacea, inflorescence loose (*syn.* Pachysandra coriacea).
— hookeriana, 1′ to 4′, Je., hlf-hdy., yel. (*syn.* hookeriana).
— latifolia, lvs. broad.

SARCOCOLLA.

Greenhouse shrubs (*ord.* Penæaceæ) from South Africa. The habit and inflorescence are very like those of the Penæas, which *see* for cultural details. The Sarcocollas are of little garden value. Sarcocool is the name given to the gum resin furnished by squamosa.

Principal Species :—

imbricata, 1½′, Je., grh., pk. (*syn.* Penæa imbricata).
squamosa, 1′, Je., grh., red.

SARCOLOBUS.

Stove, twining shrubs (*ord.* Asclepiadeæ), few in number, of little garden value, and probably not now in cultivation.

SARCOSTEMMA.

Leafless stove herbs (*ord.* Asclepiadeæ), some of them climbers, with small flowers, and occasionally double corollas. Several species formerly included here are now referred to Philibertia. Propagation, by cuttings of side shoots, in April, in sand. The cutting pots may be placed on a shelf near the glass. Soil, loam and leaf mould in equal parts, with one-fifth sand. Keep the plants rather dry at the root in winter.

Principal Species :—

brunonianum, flowers bright yel., in umbels.

SARMIENTA.

The only species (*ord.* Gesneraceæ) is a shrub with wiry stems, rambling over rocks and tree stems. It is not often seen in collections, but is a pretty plant, repaying attention. It is not easy to grow. Propagation, by cuttings, which are difficult to root. Soil, three parts fibrous peat and one part sphagnum, with sand and charcoal. The plants may be accommodated in pans or Orchid baskets. A piece of rather soft Tree Fern stem is good for them. Plenty of water, shade from direct sunshine, and a position in continually moist

Sarcoglottis (*see Spiranthes*).
Sarcopodium (*see Bulbophyllum and Dendrobium*).
Sargentia aricocca (*see Pseudophœnix Sargentii*).

surroundings near the glass in a warm greenhouse are essentials.

Only Species :—

repens, sum., warm grh., sc., flowers solitary (*syn.* scandens).

SARRACENIA.

Description.—Indian Cup, Pitcher Plant, Side Saddle Flower, and Trumpet Leaf are a few of the popular names that have been bestowed upon these curious plants (*ord.* Sarraceniaceæ). There are about half a dozen species, but many handsome hybrids have been raised from them. All are half-hardy perennials from North America. Purpurea is indeed hardy in sheltered places, and at Kew it does exceedingly well in a swampy nook in the rockery, simply covered with a little Bracken in winter. The others thrive in a cool greenhouse, but as their surroundings have to be constantly rather moister than those required or appreciated by other greenhouse plants it is well to set apart a small house for them. The plants do not flower until they have reached a good size. The conspicuous portion of these drooping blooms is the curious, five-partite, umbrella-shaped style, the parts of which are petaloid in appearance.

Propagation.—By division in early spring, before growth becomes active. A few weeks in a close case are necessary, as the plants do not care to be disturbed. Seeds are employed to obtain new forms; they should be sown in pots filled with similar compost to that in which the old plants are growing. If there is room they may be sown by the sides of the old plants, in the same pots.

Soil.—Fibrous peat, from which all the dust has been shaken, three parts, and chopped sphagnum one part, with a few pieces of charcoal.

Other Cultural Points.—The pot plants must have free drainage, liberal supplies of water during the growing season—liquid cow manure is appreciated—less when resting. The roots must never be allowed to get dry. The house, although it should be kept close, need not be warm. All draughts must be avoided. Winter minimum, by night 45°, by day 50°. Summer, as cool as possible.

Principal Species and Varieties :—

[NOTE.—p=pitchers. The whole of the leaf goes to form the pitcher, which is erect, or nearly so, and bears a "lid" at the top of the tube.]

Drummondii, p. 2′ long, variegated wh., with pur. veins, flowers 3″ wide, pur.; has two crops of p., one in autumn.
— alba, more wh., tall.
— rubra, p. marked red instead of wh., dwarfer.
Claytonii, p. pur., upright, rigid habit; a garden var.
flava, p. 2′, yel., winged, spr., flowers 4″ to 5″ across, yel., showy. Trumpet Leaf, Watches.
— atrosanguinea, lid of p. with red veins, ultimately blood red.
— Catesbæi, p. large, wings with red veins (*syns.* Catesbæi, Fildesii of gardens, and flava picta).
— limbata, p. large, lid banded br., crim.
— maxima, very large, lids pale grn.
— ornata, p. lids recurving, veined pur. red, flowers 6″ to 8″ across, grn. yel.
— picta (*see* var. Catesbæi).
psittacina, lvs. 2″ to 4″ long, p. winged, wh., veined pur., lid beaked, spr., flowers pur.
purpurea, 4″ to 6″ long, winged, pur. veins, spr., pur. Huntsman's Cup.
rubra, p. 10″ to 18″, erect, winged, pur. veins, My., flowers reddish pur.
— acuminata, p. pale grn., pur. veins (*syn.* rubra).

Other Species and Varieties :—

atrosanguinea (*see* flava var.).
Catesbæi (*see* flava var.).
Fildesii of gardens (*see* flava Catesbæi).
undulata (*see* Drummondii).
variolaris, p. 6″ to 12″ high, 2″ across, winged, spotted wh., My., yel. (*syns.* minor, adunca).

Hybrids. A Selection :—

Chelsoni, intermediate between the two species (rubra × purpurea).
Courtii, p. crim. pur. in lower half when young, then blood red, with blackish pur. veins (purpurea × psittacina).
formosa, p. grn., spotted wh., crim. above, base grn. (purpurea × variolaris).
mitchelliana, p. olive grn., red veins (rubra × purpurea).
Stevensii, p. with crim. veins, lid crim., crisped (purpurea × flava).
swaniana, greenish pur., crim. veins (variolaris × purpurea).
Williamsii, p. grn., ribbed crim., handsome (purpurea × flava).

Other Hybrids :—

atkinsoniana (flava maxima × purpurea).
crispata (? flava × rubra), probably a natural hybrid.
decora (psittacina × variolaris).
excellens (variolaris × Drummondii alba).
exornata (purpurea × crispata).
illustrata (flava picta × Stevensii).
maddisoniana (variolaris × psittacina).
mandaiana (flava rubra × Drummondii).
melanorhoda (Stevensii × purpurea).
Moorei (flava × Drummondii).
Popei (flava × rubra).
Sanderæ (Drummondii alba × cookiana).
sanderiana (Drummondii rubra × Farnhami).
tolliana (Drummondii alba × flava).
Willisii (Courtii × melanorhoda).
wrigleyana (psittacina × variolaris).

SARSAPARILLA.

This name is given to the roots of several species of Smilax, which are of value medicinally, especially for disorders of the blood. The Chinese eat the roots of S. China, the China Root, and the people of South Carolina brew a beer from the roots of S. Pseudo-China. (For further information, *see* SMILAX.)

SASHES (*see* FRAMES).

SASSAFRAS.

A hardy, deciduous tree (*ord.* Laurineæ), of ornamental appearance, possessing strong aromatic properties and mucilaginous leaves and twigs. It exhibits considerable variation in the size of its leaves. A beer is made from the young shoots in Virginia, and an oil obtained from the fruits is largely employed by perfumers. Propagation, by cuttings in sandy soil, under a hand-glass, in a cold frame. Soil, sandy loam.

Only Species :—

officinale, 15′ to 30′, Ap., hdy., greenish yel. (many *syns.*, including albidum, Sassafras, variifolium, and Laurus albida, diversifolia, and variifolia, Persea Sassafras, and Tetranthera albida).

SATUREIA. (SAVORY.)

Aromatic herbs or low shrubs (*ord.* Labiatæ), all hardy. Few of the species have been introduced.

Sarothamnus scoparius andréanus (*see Cytisus scoparius andréanus*).
Sassafras, Californian (*Umbellularia californica*).
Sassafras, Swamp (*Magnolia glauca*).
Satin Flower (*see Sisyrinchium*).
Satin Moth (*see Liparis*).
Satin Wood Tree (*Chloroxylon Swietenia*).

Propagation, by seeds sown in drills in April for the annual hortensis; by cuttings of the young side shoots in March and April, and by division, for the perennial montana. Any fairly fertile garden soil. (*See also* SAVORY.)

Principal Species :—

hortensis, 6″ to 8″, Jy., hdy. ann., lil., small.
montana, Je., hdy. per., pale pur., stems woody at base, branching. Illyrica is a var.

SATURNIA.

A genus of moths whose larvæ are silk producers. They are of little moment, however, and do not do enough damage to bring them under the notice of the gardener.

SATYRIUM.

A large genus (*ord.* Orchidaceæ) of terrestrial, deciduous, tuberous-rooted Orchids. A number of species are known to gardeners, and they are for the most part half-hardy or very nearly hardy. Propagation, by division of the roots just as growth is beginning. Soil, turfy loam, fibrous peat, and sand. Potting should not be firm, but the drainage must be free. When growth has died down, keep the tubers quite cool, and very nearly dry. Liquid manure is excellent in the growing season.

Principal Species and Varieties :—

[NOTE.—Except where otherwise mentioned, a frame or cool house is sufficient. b = bracts, which are often a prominent feature of the flower spikes.]

candidum, 1′ to 1½′, Sep., wh., fragrant.
carneum, 1½′, Je., wh., flushed pk., b. ro. margined.
— roseum, ro.
coriifolium, 1′, Oct., yel. (*syn.* cucullatum of Loddiges).
— aureum, 1′ to 1¼′, sum., or. shaded crim. (*syn.* aureum).
macrophyllum, 1½′ to 2′, Jy., rosy pk.
membranaceum, 1′ to 2′, spike 3″ to 5″ long, My., car.
nepalense, 1′ to 1½′, sum., warm grh., rosy pk., fragrant.
— ciliatum, Aug., pk., wh. (*syn.* ciliatum).
— wightianum, spike shorter, lvs. broader.

Other Species :—

erectum, 1′ to 1½′, Feb., yel., pur. (*syn.* pustulatum).
foliosum, 1′ to 1½′, Jy., pale pur., small.

SAUCERS.

It is very necessary that plants which are standing upon tables in dwelling rooms should be placed in saucers. But water must not be allowed to stand in these receptacles, for, apart from the unpleasant smell given off by stagnant water, it is also injurious to the plants. Where, however, plants are pot-bound, and are continually demanding water, it will be well to stand them in saucers containing 2″ or 3″ of water. Spiræas, for instance, are exceedingly difficult to keep in condition in a dwelling room, unless some such plan as this be adopted. Saucers used for the above purposes should, if possible, be glazed.

Occasionally, in the plant houses, a choice Orchid or Fern may be protected from the onslaughts of woodlice and cockroaches by standing it upon an inverted pot placed in a saucer of water. Hanging saucers are frequently employed to bring plants up near the glass, and this is really a better plan than suspending the pot, particularly in a show window or plant house, seeing that a relay of plants can be kept up and a succession of bloom or foliage provided.

Saucers of all sizes, of the same ware as the flower pots, may be obtained quite cheaply from the sundriesman. For the drawing room, however, china is to be preferred to the commoner pot ware.

SAUNDERSIA.

A stove epiphytal Orchid (*ord.* Orchidaceæ), of no great pretensions to beauty, and rarely grown. It may be treated like the Epidendrums.

Only Species :—

mirabilis, grn., wh.

SAURAUJA (*syns.* BLUMIA, MARUMIA, and REINWARDTIA of BLUME).

A large genus (*ord.* Ternstrœmiaceæ) of stove trees and shrubs. Few are of any decorative value. Propagation, by cuttings of ripened shoots rooted in sand, in a close frame, with bottom heat. Soil, loam and peat in equal parts, with one-eighth sand and a few pieces of charcoal.

Principal Species :—

excelsa, 10′, Je., wh.
lanceolata, a scrubby shr., grn.
nepalensis, 6′, Aug., wh.
spectabilis, 10′, Je., wh.

SAUROMATUM.

A small genus (*ord.* Aroideæ) of curious stove, warm greenhouse, and half-hardy herbaceous perennials, with tuberous rootstocks. Propagation, by offsets removed from the parent plants in spring. Soil, fibrous loam and peat in equal parts, with sand. Copious supplies of water are needed all through the summer, with a moist atmosphere; less water at the root, and a much drier atmosphere, in winter.

Principal Species :—

guttatum, 1′, My., grh., hlf-hdy., pur., yellowish grn. (*syns.* punctatum and venosum, and Arum venosum).

SAUROPUS (*syn.* CERATOGYNUM).

Stove shrubs (*ord.* Euphorbiaceæ), in habit like the Phyllanthuses, and thriving under the same cultural treatment. Probably the species albicans is the only one that has yet been introduced, and even it is rare. The variety gardnerianus, like the type, has whitish flowers and slender, green branches.

SAURURUS (*syns.* ANONYMOS, MATTUSCHKIA, and SPATHIUM. LIZARD'S TAIL.)

A small genus of hardy, aquatic, perennial herbs (*ord.* Piperaceæ). Propagation, by seeds and divisions in spring. Soil, sandy loam, near a lake, stream, or tank.

Principal Species :—

cernuus, 1′ to 2′, spikes 4″ to 5″ long, sum., hdy., wh. American Swamp Lily.
Loureiri, close to cernuus, angular stem.

SAUSSUREA (*syns.* BENNETIA, and HETEROTRICHUM of BIEBERSTEIN).

Hardy perennial herbs (*ord.* Compositæ), including Aplotaxis and Frolovia, of little garden value. Propagation, by seeds, sown out of doors. Any ordinary garden soil.

Principal Species :—

japonica, 2′, Jy., pur. (*syns.* pulchella and Serratula pulchella).

Sauroglossum (*see Spiranthes*).

Other Species :—

albescens, 2′, Jy., pur., lvs. wh. beneath (*syn.* Aplotaxis albescens).
alpina, 6″ to 8″, Aug., pur.; British (*syn.* macrophylla).
elegans, 2′, Jy., pk., lower lvs. pinnatifid.
pygmæa, 1′, Jy., pur. (*syn.* Serratula pygmæa).

SAUVAGESIA.

Glabrous herbs and sub-shrubs (*ord.* Violariæ), all from tropical America. Erecta is an annual, reared from seeds sown thinly in heat in March, and subsequently treated like other tender seedlings. Soil, loam and peat in equal parts, with sand.

Principal Species :—

erecta, 6″, sum., st., pk. or pur. red (*syn.* geminiflora). Iron Shrub, St. Martin's Herb.

Photo: W. H. Waite, Edinburgh.

SAXIFRAGA BURSERIANA IN THE ROCK GARDEN (*see p.* 313).

SAVORY, SUMMER.

Summer Savory (Satureia hortensis, *ord.* Labiateæ) is an annual herb of aromatic properties, used for flavouring and seasoning. Seed may be sown outdoors, in April, in rather shallow drills about 1′ apart, in a shady position. Thin the seedlings to 6″ apart in the rows. As soon as the flowers have developed, pull the plants up, dry, and store them for use, as with Basil. (*See also* SATUREIA.)

SAVORY, WINTER.

Winter Savory (Satureia montana, *ord.* Labiateæ) is a hardy evergreen sub-shrub. Propagation, by cuttings, root divisions in spring, and seeds. The plants may be put out 1′ apart each way. Any garden soil. (*See also* SATUREIA.)

SAVOY.

Description.—As an autumn and winter green vegetable, whether for its quality or its profitableness as a crop, the Savoy (Brassica oleracea bullata major) has no superior, and is, in fact, the closest rival of its relative the Brussels Sprouts. On poor soil it will usually give a better return than either Brussels Sprouts or Cabbages, although it is quite capable of appreciating rich food, and plenty of it.

Sowing.—As a rule one sowing only is needed—outdoors with the other Greens in April. Earlier sowings are neither necessary nor profitable, for when the heads turn in early they lack that delicious flavour which they have when frosted; also there is generally a good selection of vegetables early in autumn, and the Savoys are not so much needed then as they are later.

Cultivation.—This does not differ materially from that given to other Greens. Thin sowing is advisable, otherwise the plants become drawn and weakened in the seed beds, and do not quickly recover. Planting out should be performed about the latter end of June or the beginning of July at the latest, a showery spell being taken advantage of if possible. The position the plants occupy must largely depend upon the vacancies that occur about this time. Crops upon loose soil do not stand frost well. The soil should therefore be fairly firm. The distance allowed between the plants will depend entirely upon the variety grown. Thus, late crops of Tom Thumb may be dibbled in on a north border with about 10″ between the plants, and 12″ will represent the maximum space needed. For the medium sized varieties, such as Perfection, 18″ each way will be required; whilst for the large Drumhead varieties 2′ between the plants will not be too much if the ground be rich, 20″ if it be poor. As a rule, the Drumhead varieties are too large and coarse for ordinary use. Once the heads are cut the stumps should be cleared away.

Varieties. A Selection :—

Small :—

Tom Thumb, may be planted after early Potatoes.
Early Ulm, an early sort of great merit.

Savannah Flower (*see Echites*).
Savin Tree (*see Juniperus Sabina*).

Medium :—

Green Curled. Yellow Globe. Perfection.

Large :—

Drumhead. Late Drumhead.

SAWDUST.

The manurial value of dry sawdust is slight, and it is slow in action. It is best to reduce it to ashes, when it is an excellent stimulant for many vegetables, especially Potatoes and Onions upon heavy ground. Mixed with urine, liquid sewage, or gas liquor its value is considerably increased, but it is at best a rather rank manure, and should be used with very great caution. One of the best methods of employing it is to mix it with night soil, and allow it to rot somewhat before putting it upon the ground.

Photo: C. B. Bick.

SAXIFRAGA COTYLEDON PYRAMIDALIS

(*see p.* 312).

Clean sawdust may be occasionally turned to advantage as plunging material in propagating pits, in place of leaf mould or Cocoanut fibre refuse, although it is not so suitable for the purpose. It is excellent packing material for the hollow walls of fruit rooms, but it should be thoroughly dried before being put in, or it will turn sour and smell badly. Sometimes it has been used for packing round wooden beehives in the winter months, instead of cork dust, and being light, dry, and warm it is an efficient substitute for the latter.

SAWS.

For the removal of large branches saws are indispensable. The forester must of necessity keep an assortment of sizes, varying from the large cross-cut to the small hand saw which the fruit tree pruner finds so handy for taking out small branches. These small saws have usually a plain curving, instead of a D-shaped handle as in the larger sizes; the blade is narrow, more or less curving, carried to a point, and set so that the cut of the blade is in the pull and not in the push, as in the ordinary carpenter's saw. Makes are to be had which cut both in the pull and the push, the teeth being set both ways, but they are not often met with. The length of the blade may vary from 8″ to 12″.

For convenience of carrying, the pruning saw should be carried in a leather sheath, fastened by a belt to the operator. If a little oil be rubbed over the blade and between the teeth frequent sharpening will not be necessary, although after a hard season's use the teeth will require to be set again so as to render the running easier. Unless the teeth are set back far enough to ensure a fairly wide passage the blade will be sure to "pinch" badly as soon as it has penetrated to any depth in the branch, and a pinching saw is a heavy handicap to the pruner.

Saw Wort (*see Serratula*).

SAXEGOTHEA.

A hardy evergreen (*ord.* Coniferæ). For cultural details, *see* TAXUS

Only Species :—

conspicua, 30′, Je., hdy., fruit a rather fleshy solid cone, lvs. stiff and leathery. Prince Albert's Yew.

gracilis of gardens (now Podocarpus nubigena).

SAXIFRAGA. (ROCKFOIL.)

Description.—A large genus of hardy or half-hardy annual and perennial plants (*ord.* Saxifrageæ) much prized by growers of Alpines, but capable of being used in many ways in the garden. For edgings a considerable number are well adapted, and several of the taller growing, encrusted, or Euaizoonia, forms make pretty pot plants. They vary much in their character, some forming moss-like tufts and masses, others mounds of silvery rosettes, and others large glossy leaves, as in the Bergenia section; while the well-known species umbrosa or London Pride is typical of another class, known as the Robertsonia section. The Saxifrages are so numerous that only a selection can be given, and it ought to be observed that there is great confusion in the nomenclature of the genus, and that few collections, however carefully compared with the best authorities, are in a position to have their plants accepted as correctly named. For a small collection those marked * are suitable.

Propagation.—By seeds, sown in spring or when ripe, in pots or pans under glass; by division after flowering; some species by cuttings, and some, of the type of sarmentosa, the Mother of Thousands, by runners. Seeds from Saxifrages in large collections are not to be depended upon to give plants true to name.

Soil, and Other Cultural Points.—The Saxifrages vary much in their requirements, and only general directions can be given in the available space. Those of a mossy habit, and such species as Hirculus, like a moist soil, though the ordinary mossy forms do not object to being fairly dry if not "burned up" in summer. The encrusted forms can do with more drought, and are all the better for a little lime in the soil, which should have plenty of sand, grit, and small stones in it. Some of the Bergenia types are not quite so hardy as the others, and their early flowering often calls for their covering with glass to protect the blooms from frost. They

make good plants for a cool or cold house. Peltata is a moisture lover, and likes a good soil where its roots can reach water. The Robertsonia class can do with common soil, and the Porphyrion class require plenty of water at the root in the crevices of the rockwork, but do not like much overhead.

Selection of Species and Varieties :—

Bergenia Section. — Frequently known as Megaseas, leaves large and rather fleshy. Many seedling varieties are in cultivation.

*ciliata, 1′, spr., pk.
cordifolia, 1′, spr., pk.; vars. purpurea and alba.
crassifolia, 1′, spr., pk.
*ligulata, 1′, spr., pur.; several vars., including wh.
Milesii, 1′, spr., red.
purpurascens, 1′, spr., pur.
*Stracheyi, 1′, spr. pk.; var. alba.

Boraphylla Section. — Moisture lovers, leaves radical, flowers in panicles. Sun.

Clusii, 6″, Ap., whitish pk.
*hieracifolia, 9″, My., reddish.
nivalis, 6″, Je., wh.; var. densiflora.
pensylvanica, 1½′, Je., reddish.
*stellaris, 6″, Je., Jy., wh.

Cymbalaria Section.—Dwarf, annual or biennial. Sow themselves freely.

huetiana, 2″, sum., yel.
*Sibthorpii, 2″, sum., yel. (*syn.* Cymbalaria).

Dactyloides Section.—Of tufted, moss-like growth. Pretty, and easily grown.

ajugifolia, 1′, My., creamy wh.
androsacea, 1′, Je., wh.
aphylla, 3″, Je., pale yel.; vars. leptophylla and virescens.
aquatica, 1′, Jy., wh.; var. capitata.
*cæspitosa, 3″, Jy., wh.; vars. hirta and platyphylla.
*Camposii, 3″ to 6″, My., wh. (*syn.* Wallacei).
citrina, 2″, My., greenish yel.
conifera, 4″, Je., wh.
*cuneata, 6″, Je., wh.
decipiens, 6″, My., wh.; vars. grœnlandica, quinquefida, and Steinmanni.
exarata, 6″, Je., wh.; vars. adenophora and nervosa.
*geranioides, 6″, Jy., wh.
gibraltarica, 6″, My., wh.
hypnoides, 6″, My., wh.; vars. elongata, *variegata, and Whitlavii.
iratiana, 6″, My., wh.
muscoides, 3″, My., yellowish wh.
—* atropurpurea, purplish red.
*— Rhei, ro.
Other vars., albida, moschata, pygmæa, etc.
pedatifida, 6″, My., wh. (*syn.* Prostii).
*pedemontana, 6″, My., wh.; vars. cervicornis and cymosa.
sedoides, 9″, My., wh.
Seguieri, 3″, My., yel.
sponhemica, 4″, Je., wh.; vars. affinis, hirta, and lætevirens.
*trifurcata, 6″, My., wh.; var. ceratophylla.

Diptera Section.—Tender. Pretty for hanging baskets or pots.

cuscutæformis, 6″, Je., wh.
*Fortunei, 6″, Sep., hlf-hdy., wh.
sarmentosa, 9″, Je., wh., yel., sc. Aaron's Beard, etc.
*— tricolor superba, foliage cream and red.

Euaizoonia Section. —Encrusted, leaves generally margined with whitish dots, and flowers in panicles.

*Aizoon, 3″ to 10″, Je., cream, spotted red; many vars. varying in height, etc., but all pretty, a selection being carinthiaca, Churchillii, cultrata, Guadinii, la gaveana, Malyi, minor, pectinata, pygmæa, recta, robusta, rosularis, sempervivoides, and sturmiana.
Andrewsii, 6″, sum., wh., dotted pur.
cartilaginea, 6″, Je., wh., pk. or pur.
catalaunica, 6″, Je., wh., spotted red (lingulata of some).
cochlearis, 1′, Je., wh.; var. minor.
*Cotyledon, 1′ to 2′, My., wh.; var. nepalensis.
— pyramidalis, taller (*see p.* 311).
*crustata, 1′, Je., wh., dotted red.
*Hostii, 6″ to 12″, My.,

Photo : W. H. Waite, Edinburgh.

SAXIFRAGA SANCTA (*see p.* 313).

wh.; vars. altissima and elatior.
kolenatiana, 1′, Je., wh., pk. or pur.
lingulata (Bell, not Wallich), 1′ to 1½′, My., wh.; lantoscana and superba are fine, tall forms.
*longifolia, 1′, Je., wh., spotted red.
*marginata, 4″, Jy., wh.
mutata, 6″ to 12″, Je., coppery; var. demissa.
*paradoxa, 1″ to 2″, My., yel. (*syn.* pygmæa).
Portæ, 4″, Je., wh.

Hirculus Section.—Bog lovers with small, entire leaves.

diversifolia, 6″ to 15″, Jy., yel.
Hirculus, 4″ to 8″, Aug., yel.
*— major, larger.

Isomeria Section.—Underground rhizome or root-stock and rounded leaves; grows in half shade.

aconitifolia, 1¼′, My., wh. (correctly Boykinia aconitifolia).

Kabschia Section.—Small tufted plants of much beauty.

*apiculata, 2″, spr., pale yel. (*syns.* aretioides, micropetala, luteo-purpurea of gardens, etc.).
aretioides, 2″, My., yel.
*— primulina, pale yel.
Other vars., alba and præcox.
*Boydi, 2″, spr., yel.; hybrid (burseriana × aretioides?); var. alba.
burseriana, 1½″, Feb., wh. (*see p.* 310).
*— major, larger, earlier.
*cæsia, 2″, My., wh.
*diapensioides, 1½″, Ap., wh.; var. tombeanensis.
Frederici-Augusti, 3″, Je., vio. (that of gardens is apiculata).
imbricata, 3″, Je., wh.
juniperifolia, 3″, Jy., yel.
Kotschyi, 3″, yel.
luteo-viridis, 3″, spr., grn.
media, 6″ to 8″, Je., purplish ro.
*rocheliana, 3″, sum., wh.
*— coriophylla, lvs. broader, smaller.
*sancta, 2″, spr., yel. (*see p.* 312).
scardica, 2″, Je., wh.
squarrosa, 2″, Je., wh.
*valdensis, 3″, My., wh.
Vandellii, 2″, Je., wh.

Miscopetalum Section.—Rather fleshy leaves, generally heart shaped and lobed. Half shade. Moisture.

*rotundifolia, 1′, My., wh., sc. dots; vars. angulosa, heucherifolia, lasiophylla, and repanda.
*taygetea, 1′, My., wh., sc. dots.

Nephrophyllum Section.—Generally with bulbils at the base and on the floral stems.

biternata, 4″, Je., wh.
cernua, 2″ to 6″, Je., wh.
granulata, 6″ to 18″, Ap., wh. Meadow Saxifrage.
*— flore pleno, double.
rivularis, 4″, Jy., wh.

Peltaphyllum Section.—Large-growing species.

*peltata, 3′ to 5′, Ap., wh. or pk.

Porphyrion Section.—Charming dwarf plants.

biflora, 2″, My., red; var. Kochii.
*oppositifolia, 2″, Ap., pur.; many vars., a selection being *alba, blepharophylla, grandiflora, major, pyrenaica and its forms maxima, major, *rubra, and *splendens; *rudolphiana, and r. compacta.
*retusa, 1½″, My., pur.
— wulfeniana, pur.

Robertsonia Section.—Like London Pride.

cuneifolia, 6″, My., wh.; vars. apennina, etc.
*Geum, 9″, My., wh., spotted red; vars. elegans and polita.
*hirsuta, 6″ to 12″, Je., whitish red; vars. dentata and gracilis.
umbrosa, 6″ to 12″, Je., whitish red. London Pride, None-so-Pretty.
*— serratifolia, lvs. serrated.
*— variegata.
Other forms, Colvillei, gracilis, and minor.

Trachyphyllum Section.—Dwarf tufts of fleshy or leathery, entire leaves.

*aizoides, 2″, Je., yel.
*— aurantiaca, or. yel
aspera, 2″, My., yellowish wh.
*— bryoides, 2″, My., wh.
bronchialis, 6″, My., cream; vars. cherleroides and conferta.
flagellaris, 3″, My., yel.
tenella, 6″, Je., wh.

Tridactylides Section.—Fleshy, cuneiform leaves, in rosettes, lobed or entire. Small flowers.

petræa, 3″, Ap., ann., wh.; var. Blavii.

Hybrids of merit in addition to some in the above lists: Engleri, *Forsteri, mœnabiana, *Salomoni, splendens, tyrolensis, and Zimmeteri.

SAXOFRIDERICIA.

A small genus (*ord.* Rapateaceæ) of strong-growing stove sub-aquatic herbs from Guiana and Northern Brazil. Propagation, by root division in spring. Soil, loam and peat in equal parts.

Principal Species:—

subcordata, 1′, br., red, spiny petioles (*syn.* Rapatea pandanoides).

SCABIOSA. (SCABIOUS.)

A genus of hardy annual or perennial herbs (*ord.* Dipsaceæ). A good many are very ornamental in the flower garden in borders or beds, and some of the dwarfer species are beautiful Alpines for the rock garden. The varieties of atropurpurea are among the most useful annuals for the garden or for cutting. Caucasica is a very ornamental perennial. The former, if sown in summer and grown in pots in a cold frame, are useful in winter. Propagation, by seeds sown in spring under glass, or in April or May in the open borders; the perennials by division. Ordinary garden soil; caucasica and the smaller Alpines like one of a light character.

Principal Species and Varieties:—

atropurpurea, 2′ to 3′, Jy., ann., deep crim.; many seedling vars. The double and dwarf double forms are very useful, and can be obtained in almost any colour from seeds. Mournful Widow, etc.
caucasica, 1′, Je., per., pale bl.
— alba, wh.
— hybrida, various colours.
ochroleuca webbiana, 6″, Jy., pale yel. (*syns.* webbiana).
pterocephala, 3″ to 6″, sum., per., pur. (*syn.* Parnassi).

Other Species:—

alpina (now Cephalaria alpina).
amœna, 2′ to 3′, Je., per., lil.
arvensis, 2′ to 4′, Jy., per., lil. or pale bl. (*syn.* Knautia arvensis).
Columbaria, 1′ to 2′, Jy., per., lil. or bl.
correvoniana, 9″, My., per., yel.
graminifolia, 1′, Je., pale bl.
palæstina, 1′ to 3′, sum., ann., various (*syn.* Metaxasii).
stellata, 1½′, Jy., ann., pk. or wh.
succisa, 1′, Jy., per., bl., pur. or wh. Devil's Bit, Blue Bonnet, etc.
Victoriæ, ann., hybrid.

SCÆVOLA.

A rather large genus (*ord.* Goodenoviæ) of stove and greenhouse shrubs and perennial herbs. Propagation, by cuttings, under a hand-glass in the greenhouse, except for Plumieri, which needs heat. Soil, turfy loam and peat in equal parts, with sand. All greenhouse except where otherwise stated.

Principal Species:—

Kœnigii, 2′, Aug., pale red. Malay Rice Paper Plant.
Plumieri, 2′, Aug., st. shr., wh.
suaveolens, Aug., hdy. or grh. per. herb or sub-shr., bl. (*syn.* Goodenia calendulacea)

Other Species :—

anchusæfolia, My., prostrate herb or sub-shr., bl.
attenuata, 1½′ to 2′, Je., shr. or sub-shr., bl.
cuneiformis, sum., herb, bl.
grandiflora (now Leschenaultia linarioides).
microcarpa, Jy., per. herb, bl. (*syn.* Goodenia lævigata).
pilosa, 1′ to 3′, My., per. herb or sub-shr., bl.
platyphylla, 2′, My., wh.

SCALE.

The Scale insects (Coccidæ), belonging to the Homoptera, are among the most harmful of insects. Some of the many species are familiar to all gardeners. There are two notable exceptions to the possession of injurious qualities, namely the Cochineal Insect (Coccus Cacti) and the Lac Insect (Tachardia lacca), both of which are of economic value. An idea of the size and importance of the Scales among insect pests will be gained from the following list of some of the principal species.

Aspidiotus brittanicus. Hollies.
— Camelliæ (Camellia Scale). Camellias.
— Nerii (Oleander Scale). Oleanders.
— Palmarum. Palms and Cycads.
— perniciosus (San José Scale). Fruit trees.
Chionaspis Euonymi. Euonymuses.
Diaspis ostreæformis (Oyster Shell Bark Louse). Fruit trees.
Diaspis Rosæ. Roses.
Ischnaspis filiformis. Palms.
Lecanium Coryli. Currants.
— Hesperidum. Oranges.
— Persicæ (Peach Scale). Peaches.
— Rosæ. Roses.
Mytilaspis Pomorum (Mussel Scale). Apples.
Orthezia insignis. Omnivorous.
Pulvinaria Ribesiæ (Cottony Cushion Scale). Currants.
— Vitis (Cushion Scale of the Vine). Vines.

The female Scales are much bigger than the male, and they are directly injurious to the tree they infest, sucking out the vital juices; the males are not. At first possessing power of movement, the females soon lose this. The eggs are sheltered by the familiar horn-like scale, some species having a further protection of a white coating of felted threads for their eggs. In a few species the females are viviparous.

Details of the habits and appearance of the principal of these pests are given under their several headings, together with remedies. (*See also* INSECTICIDES.)

SCALLION.

This term is applied to Allium ascalonicum majus, and occasionally to young Onions with thick necks. Usually, however, it means Onion bulbs that have been planted in early spring to make growth, but are not allowed to seed. As soon as they are about 1′ high they are pulled up and used as required. By this means "young" Onions are obtained some time in advance of those from seed. Scallions may be planted in rows 12″ apart and 6″ between the plants in the rows. Several "cloves" will usually be formed by each bulb. Scallions are of use for temporary requirements only. They will not make bulbs, but if left long enough will run to seed.

SCAPHOSEPALUM.

A small genus of Orchids (*ord.* Orchidaceæ). They were formerly placed with the Masdevallias, like which they may be treated.

Scammony (*Convolvulus Scammonia*).

Principal Species :—

anchoriferum, 3″ to 6″, sum., grh., greenish yel., crim. maroon, with greenish yel., crim. spotted tails (*syn.* Masdevallia anchorifera).
breve, like anchoriferum, sum., grh., br., yel., and pur. (*syn.* Masdevallia brevis).
gibberosum, 6″ to 9″, sum., grh., creamy wh., grn., dotted pur.
pulvinare, 9″, win., grh., greenish pur., br. (*syn.* Masdevallia pulvinaris).
punctatum, 3″ to 5″, aut., grh., grn., spotted pur.
swertiæfolium, 3″ to 6″, aut., grh., yel., spotted br., pur. (*syn.* Masdevallia swertiæfolia).

Other Species :—

antenniferum, greenish yel., br., close to pulvinare.
microdactylum, greenish yel., br., small.
ochthodes, yel., grn., small, a nearly perpetual flowerer.

SCAPHYGLOTTIS.

Stove epiphytal Orchids (*ord.* Orchidaceæ) of branching habit. Similar treatment to that given to Cattleyas will suit. Few of the species are in cultivation.

Principal Species :—

stellata, larger flowers than violacea.
violacea, vio., lip wh.

SCARES.

Many devices for scaring birds from Corn, ripe fruit, and seed beds generally are in existence, but few are of much use. The usual rather hideous scarecrow with its heterogeneous wardrobe is not now so frequently seen. The wooden clappers which are set in motion by the wind are not of much service, as the birds soon get used to the noise. In rural districts the favourite method of bird-scaring is to set a boy to fire off a few half-charges of powder at intervals, but even then the birds soon find out that the noise does not hurt them and resettle to their work of depredation. Fastening pieces of gaudily coloured paper and rag to fruit trees is certainly not more effective than any of the foregoing methods. The only plan that can be at all depended upon, unless the seed beds or trees are netted completely over, is to twist over and round them, to the branches of the fruit trees or to stakes pushed into the seed beds, a number of strands of black thread or cotton. This the birds cannot easily see, and they get their wings entangled without being able to discern what is responsible for it. The result usually is that they shun the place. White cotton or thread is often used. Brick traps are occasionally employed to catch stragglers, but they do very little towards lessening the numbers of the marauders.

SCARLET RUNNERS (*see* BEANS).

SCARLET TIGER MOTH.

Like the larvæ of all the Tiger moths, those of the Scarlet Tiger (Callimorpha Dominula) are very thick bodied and hairy. The moths are about 2½″ across the forewings, which are dark olive brown in colour, with a number of yellow and cream spots. The hind wings are crimson, with black spots along the edges. The larvæ feed upon the Hound's Tongue (Cynoglossum) chiefly, and are only to be found, as a rule, where it grows. They are not harmful to garden plants.

SCELOCHILUS.

A small and obscure genus (*ord.* Orchidaceæ) of stove epiphytal Orchids, rarely cultivated, but needing the same attentions as the Rodriguezias.

Principal Species :—

[NOTE.—s. = sepals, p. = petals. l. = lip.]

carinatus, s. yel., p. pur., wh., l. wh., blotched pur.
Ottonis, My., yel., striped pur.
variegatus, wh., lined pur., pseudo-bulbs very flat and thin.

SCHÆFFERIA.

A small genus (*ord.* Celastrineæ) of warm house, rigid shrubs. Propagation, by cuttings of the half-ripened shoots in sandy soil, in a close frame with bottom heat. Soil, loam and peat in equal parts, with sand.

Principal Species :—

frutescens, 10′, Aug., st., wh., fruits sc. Crab-wood Tree, False Box.

SCHEELEA.

Handsome stove Palms (*ord.* Palmæ) of great decorative value, although they are by no means well known. They are of easy culture, and Unguis particularly takes kindly to dwelling room decoration. The pinnæ are frequently barred transversely from the close folding of the young leaves. Propagation, by imported seeds. Soil, loam which has been stacked with cow dung for six months, and a little sand. The plants require abundant supplies of water at the root, and liberal syringing.

Principal Species :—

excelsa, 50′, lvs. 15′ to 24′ long, with nearly 200 leaflets on each side, in twos, threes, or fives, wood reddish.
Unguis, lvs. 4′ to 10′ long: only known as a young plant.

Other Species :—

imperialis, lvs. entire at first.
insignis, 50′, lvs. 8′ to 10′ long, pinnæ in fours or fives (*syn.* Maximiliana insignis).
kewensis, lvs. 20′ to 25′ long, flowers pur.

SCHELHAMMERA (*syn.* PARDUYNA).

Two species of greenhouse perennial herbs (*ord.* Liliaceæ). Pretty, but comparatively rare in cultivation. Propagation, by division in spring. Soil, sandy peat and loam in equal parts. The plants will do outdoors in a sheltered place, but they must be well covered during the winter.

Principal Species :—

multiflora, 6″ to 12″, Je., hlf-hdy., wh., in terminal umbels.
multiflora (of Loddiges, now Kreysigia multiflora).
undulata, 6″, Je., hlf-hdy., pale lil., stems very slender.

SCHIMA.

A small genus of stove evergreen trees and shrubs (*ord.* Ternstrœmiaceæ) with large and showy flowers. Propagation, by cuttings in sandy peat, in a close frame, with bottom heat. Soil, sandy peat, with free drainage.

Principal Species :—

Noronhæ, sum., st., wh., flowers solitary (*syns.* superba and Gordonia javanica of *Botanical Magazine* 4539).
superba (*see* Noronhæ).

SCHINUS.

Stove trees and shrubs chiefly (*ord.* Anacardiaceæ), several of which exude a resinous juice. To such an extent is this fluid present in the leaves that much of it is discharged after a shower of rain, and the air in the vicinity of the tree is perceptibly perfumed. Propagation, by ripened cuttings in very sandy soil in a close case with bottom heat. Soil, loam one-third, sandy peat two-thirds. Free drainage.

Principal Species :—

dependens, 10′ to 12′, sum., hlf-hdy. or grh., yellowish wh., fruits blk.
Molle, 20′, Jy., st., yellowish grn., fruits ro.
Australian or Californian Pepper Tree, Peruvian Mastic Tree.
terebinthifolius, 20′, Jy., st., greenish wh.

SCHISMATOGLOTTIS (*syn.* ZANTEDESCHIA).

Stove herbs (*ord.* Aroideæ). The stems are short, but the leaves of several species are so prettily marbled as to make them handsome foliage subjects. Moist surroundings, both at the root and in the atmosphere, brisk heat, and comparatively heavy shade are required. Propagation, by division in spring. Soil, sandy loam, fibrous peat, and leaf mould in equal parts, with one-eighth of sand and a few pieces of charcoal. Free drainage.

Principal Species and Varieties :—

[NOTE.—s. = spathe, sp. = spadix.]

crispata, s. grn., lvs. heart shaped, broad central band of silvery grey, petioles with semi-transparent edges.
Lavallei, bright grn., mottled grey.
— immaculata, bright grn., unspotted.
— purpurea, pur. below.
longispatha, sp. yellowish grn., small, lvs. 4″ long, with central silvery grey band; a pretty little plant.
neoguineensis, s. pale grn., lvs. heart shaped, blotched yellowish grn. (*syns.* variegata of gardens and Colocasia neoguineensis).
pulchra, lvs. 4″ to 5″ long, 2″ to 2½″ broad, glaucous, spotted silvery grn. (*syn.* decora).
siamensis, lvs. glossy grn., spotted wh., small; a useful plant for small vases.

Other Species :—

picta, lvs. heart shaped, central grey band.
rupestris, s. yel., lvs. heart shaped, grn.
variegata (of gardens, *see* neoguineensis).

SCHIZÆA. (COMB OR RUSH FERNS.)

These stove, greenhouse, and hardy Ferns (*ord* Filices) are not easy to grow well, and although some of them are elegant plants, they do not find much favour with Fern lovers. Propagation, by division. Soil, loam and peat, both lumpy and roughly broken up, in equal parts, with free drainage. The plants need plentiful supplies of water, but they dislike stagnant moisture. The fronds, which are very thick and fleshy, are split up at their tips into fan-like processes—the fertile segments.

Principal Species :—

[NOTE.—The dimensions refer to the fronds.]

bifida, 6″ to 8″, forked or simple, grh.
rupestris, 3″ to 4″, grass-like, grh.

Other Species :—

dichotoma, 6″ to 9″, fan-like, much forked, st.
digitata, 1′, very narrow, fertile spikes 1½″ long, st.
elegans, 4″ to 8″, V shaped, st.
— flabellum, undivided fronds.
pennula, 1′, three-angled, st. (*syn.* penicillata).
pusilla, fertile fronds 3″ to 4″, barren ones shorter, hdy.
Srucei, 6″ to 8″, ¼″ broad, st.

SCHIZANDRA.

Stove, greenhouse, or hardy shrubs of running tendencies (*ord.* Magnoliaceæ). Propagation, by

Schœria (*see Achimenes*).

cuttings in sand, in heat according to the character of the species; those of chinensis need a cold frame. Soil, sandy peat and loam in equal parts.

Principal Species :—

chinensis, 20′, sum., hdy. cl. shr., ro., fruits sc. (*syns.* japonica, Kadsura chinensis of Turcz, not Hance, Maximowiczia chinensis, and Sphærostema japonicum).

Other Species :—

coccinea, sum., grh. cl., crim.
marmorata, st. cl., lvs. heart shaped, spotted silver, handsome (*syn.* Sphærostema marmoratum).
propinqua, 6′, Jy., st., yel. to or. (*syn.* Sphærostema propinquum).

SCHIZANTHUS. (Butterfly Flower.)

Hardy or half-hardy annuals (*ord.* Solanaceæ), with charming flowers, valuable for borders and beds, or for growing in pots under glass. Propagation, pinnatus and its varieties may be sown as directed for hardy annuals, which *see*, in the open ground; while the others should be sown under glass in a little heat, and treated like other half-hardy annuals, which *see* for cultural directions. For spring flowering in pots, sow in August or September, and keep the young plants singly in pots during winter, under glass, and in such heat as just to keep out frost. Soil, rich, open loam.

Principal Species and Varieties :—

Grahami, 1½′, sum., hlf-hdy. ann., lil., or.
— carmineus, car.
— lilacinus, lil., yel.
pinnatus, 1½′, sum., ann., rosy pur., yel. spotted.
— atropurpureus, dark eye.
— candidissimus, wh.
— papilionaceus, spotted pur.
— roseus, ro., spotted.
— violaceus, vio., pur.
retusus, 1½′, sum., hlf-hdy. ann., ro., or., crim. (*syn.* incanus).
— albus, wh.
wisetonensis, 1′, sum., hlf-hdy. ann., variable, wh., blush pk., br., etc., (*see* figure).

Other Species :—

candidus, 2′, Jy., hlf-hdy. ann., wh.
Hookeri, 2′, sum., hlf-hdy. ann., ro., yel.
violaceus (*see* pinnatus var.).

SCHIZOBASIS.

A small genus of stove and greenhouse bulbous plants (*ord.* Liliaceæ). The stems are leafless. Propagation, by seeds or offsets. Soil, light loam and sand.

Principal Species :—

intricata, grh., wh., ribbed grn.

SCHIZOCODON.

This small genus of hardy perennial herbs (*ord.* Diapensiaceæ) is closely related to the better known one of Shortia, which *see* for culture.

Only Species Introduced :—

soldanelloides, 2″ to 4″, Mch., hdy., ro., petals prettily fringed.

SCHIZOLOBIUM.

Tall, stove evergreen trees (*ord.* Leguminosæ). For culture, *see* Cæsalpinia.

Principal Species :—

excelsum, 120′, sum., st., yel., lvs. 2′ to 5′ long, wh. beneath. An uncommon plant.

Schizocæna (*see Cyathea*).
Schizoloma (*see Lindsaya*).

SCHIZOMERIA.

A distinctly ornamental greenhouse, evergreen tree (*ord.* Saxifrageæ). Propagation, by cuttings. Soil, sandy peat and loam in equal parts.

Only Species :—

ovata, 50′, Je., grh., wh.

SCHIZOMYCETES.

The Schizomycetes, or Fission Fungi, are microscopic plants, which contain some of the smallest of known organisms. It is to this group that bacteria and bacilli are referred. In most cases propagation is effected by simple cell division, although in some species of bacilli the development of spores has been noticed. From a gardener's point of view, the most noteworthy member of the group is Micro-

Photo: Cassell & Company, Ltd.

Schizanthus wisetonensis.

coccus amylovorus, which causes "blight" in Pears and Apples. Branches attacked exude a viscid, yellow substance, and it seems that prompt excision of the branch is the only trustworthy method of arresting the progress of the disease. The presence of cracks or wounds in the bark of otherwise healthy trees renders them very liable to infection; and careless pruning is often the cause of an attack.

SCHIZOPETALON.

A small genus of half-hardy or nearly hardy annuals (*ord.* Cruciferæ), with small, white or purplish, deeply lobed flowers. Walkeri, 1′, summer, white, the only one in cultivation, is a singular-looking annual, of little appearance in the border, but delightful for its delicious fragrance after nightfall. It should be cultivated as recommended for hardy annuals, which *see*.

SCHIZOPHRAGMA. (Climbing Hydrangea.)

A hardy shrub (*ord.* Saxifrageæ), with flowers something like those of Hydrangea Hortensia. It should be trained against a wall, and has a dislike to cold places. Propagation, by cuttings, in sand, under a bell-glass, with gentle heat, or by seeds. Any fairly fertile soil, such as well-worked loam, will suit the plant.

Only Species: –

hydrangeoides, 10′ to 20′, of Sieb. and Zucc., aut., hdy., wh. or flesh pk. Hydrangeoides of gardens is Hydrangea petiolaris.

SCHIZOSTYLIS. (Kaffir Lily.)

A genus of one or two species of half-hardy or hardy plants (*ord.* Irideæ) with Iris-like leaves and spikes of showy flowers. Coccinea is hardy in warm soils, and is valued for its late-blooming habits. It can be grown outside in a warm, sunny border, or lifted and potted for blooming under glass. It may also be grown in pots, plunged outside during summer, and taken into the greenhouse in autumn to bloom. Propagation, by division in sandy soil, in spring, under glass, or by seeds sown in heat in spring. Soil, sandy loam and leaf soil or peat, with well-rotted manure. Occasional waterings with weak manure water in summer are beneficial.

Principal Species:—

coccinea, 3′, Oct., sc.

SCHLIMMIA.

A small genus of stove epiphytal Orchids (*ord.* Orchidaceæ). They may be grown with the Stanhopeas, and treated like them. Neither of the two species named below is of great decorative value.

Principal Species:—

jasminodora, 8″ to 10″, win., wh., fleshy and fragrant.

trifida, win., wh., spotted pur., very fragrant.

SCHMIDELIA (*syns.* Aporetica and Ornithophe).

Stove shrubs and small trees (*ord.* Sapindaceæ), for the greater part. A few have been introduced, but have been lost sight of. The flowers are very small in all cases.

SCHŒFFIA.

Stove and greenhouse trees (*ord.* Olacineæ). Fragrans, the only species introduced, has yellow, fragrant flowers in June. For particulars of culture, and fuller description, see Schœffia.

SCHŒNIA.

A greenhouse perennial (*ord.* Compositæ), with hairy leaves and stems; scarcely distinct from the Helichrysums, and amenable to the same treatment. It is of no particular value.

Only Species:—

cassiniana, 1′ to 2′, Ap., grh. ann., yel.

SCHŒNLANDIA.

Gabonensis is a curious, stemless, stove plant (*ord.* Pontederiaceæ), recently introduced from Western Tropical Africa. The violet flowers are solitary, and the leaves are heart shaped. The plant is said to be easy to grow, but little is known as yet concerning its behaviour. It does not promise to be of special value.

Schlumbergia (*see Caraguata*).

SCHŒNOCAULON (*syns.* Asagræa and Sabadilla).

A few species of half-hardy bulbous plants (*ord.* Liliaceæ) of little decorative value. Officinale is the only species introduced.

SCHŒPFIA (*syns.* Schœffia, Codonium, and Hænkea).

Stove and greenhouse trees and shrubs (*ord.* Olacineæ), with relatively large, pale yellow or white flowers, and entire leaves. Propagation, by cuttings in sand, in bottom heat, covered with a bell-glass. Soil, peat and loam in equal parts, with sand.

Principal Species:—

fragrans, 15′, Je., st., yel., fragrant.

SCHOMBURGKIA.

American stove epiphytal Orchids (*ord.* Orchidaceæ). The flowers are showy, but pseudo-bulbs are not always produced. The leaves are thick, fleshy, and leathery. Similar treatment to that accorded to Cattleyas should be given, but the species having cylindrical pseudo-bulbs want very little water after growth is finished until they show signs of starting again. The plants may be affixed to wooden blocks, or accommodated in baskets filled with moss and fibrous peat. Propagation, by division and imported pieces.

Principal Species and Varieties:—

[Note.—s. = sepals, p. = petals, l. = lip. An intermediate house temperature will do for all here named.]

chionodora, wh., l. pur. spotted.
— kimballiana, light pur., inflorescence branching.
crispa, win., s. and p. br., flushed yel., l. wh., flushed ro.
Humboldtii, sum., win., s. and p. pale lil., l. pur., yel.
— alba, sum., wh., l. with yel. disc.
Lyonsii, sum., s. and p. wh., spotted pur., l. wh., edged yel. (*syn.* carinata).
sanderiana, 3″ across, sum., rosy pur., l. veined deeper pur. Allied to Humboldtii.
Tibicinis, sum., 2″ to 3″ across in large heads, s. and p. mauve pur., l. wh., ro., or, yel. (*syn.* Epidendrum Tibicinis). A handsome Orchid; does well on a block. Cow Horn Orchid.
— grandiflora, early sum., larger (*syn.* S. grandiflora).
undulata, spr., 2″ across, s. and p. pur. br., l. rosy pur., wh. (*syn.* Bletia undulata of *Botanical Register* xxxi. 53).

Other Species:—

carinata (*see* Lyonsii).
grandiflora (*see* Tibicinis var.).
marginata, brick red, l. wh., flushed pk., yel.
rosea, sum., s. and p. reddish pur., l. pur., ro., wh.
thomsoniana, sum., p creamy yel., l. maroon, pur., yel.

SCHOTIA. (Kaffir Bean Tree.)

Greenhouse, unarmed shrubs or small trees (*ord.* Leguminosæ), with showy, crimson or pink flowers in heads, and pinnate leaves. Though very handsome plants, Schotias are strangers to most gardeners. Propagation, by cuttings, and seeds when procurable. Soil, peat and loam in equal parts, with sand.

Principal Species and Varieties:—

latifolia, 20′ to 30′, Je., grh., ro. Elephant Hedge Bean Tree.
speciosa, 8′ to 12′, sum., grh., crim., lvs. very large, four to sixteen pairs of leaflets (*syn.* tamarindifolia).

Schousboea (*see Cacoucia*).

SCHOUWIA.

Three species only (*ord.* Cruciferæ) of branching, hardy herbs, with purple flowers and entire leaves. Propagation, by seeds sown where the plants are to flower. Ordinary garden soil.

Principal Species :—

arabica, 1′, Je., hdy. ann., rosy pur.

SCHRADERA.

Unimportant stove shrubs (*ord.* Rubiaceæ), with curious, root-bearing, fleshy branches. Propagation, by cuttings. Soil, sandy peat and loam.

Principal Species :—

cephalotes, 4′, Jy., st., wh.

SCHRANKIA. (Sensitive Brier.)

Stove and hardy herbs and sub-shrubs (*ord.* Leguminosæ), often spiny. The bipinnate leaves are frequently sensitive, and the stipules are bristly. Propagation, by cuttings of the young shoots, in sand, in a close frame, with bottom heat. Soil, loam and sandy peat in equal parts.

Principal Species :—

aculeata, 1′ to 2′, Jy., st. herb, red.

uncinata, 2′, sum., hlf-hdy. per. herb, ro. Sensitive Brier.

SCHREBERA.

An obscure genus (*ord.* Oleaceæ), not often represented in gardens. Saundersiæ, summer, white, fragrant, is in the Kew collection. Propagation, by cuttings. Soil, loam and peat in equal parts, with sand. Schrebera of Schreber is referred to Hartogia.

SCHWANNIA (*syn.* Fimbriaria).

Stove evergreen climbing shrubs (*ord.* Malpighiaceæ). Propagation, by cuttings of the ripened shoots, in sand, under a bell-glass, in heat. Soil, loam two parts, leaf mould one part, and one-tenth sand.

Principal Species :—

elegans, Je., st., red. A pretty shr. with silky branches.

SCHWEIGGERIA (*syn.* Glossarrhen).

Two species of stove shrubs (*ord.* Violarieæ). Neither of them is well known, and probably only fruticosa has been introduced Propagation, by cuttings, in sand, in a close frame. Soil, equal parts of loam and peat, with sand.

Principal Species :—

fruticosa, 4′ to 6′, Dec., st., wh. (*syn.* pauciflora).

SCHWENKIA (*syns.* Chætochilus, Mathæa, and Matthissonia).

Stove shrubs and sub-shrubs, with yellow, green, or white flowers and entire leaves (*ord.* Solanaceæ). Of the score or so of species, probably only americana has been introduced. It may be raised from seeds sown in brisk heat, in spring. Almost any light and fairly rich soil will do.

Principal Species :—

americana, 2′, Aug., lil.

SCIADOPHYLLUM (*syn.* Actinophyllum).

Stove and greenhouse trees and shrubs from tropical America (*ord.* Araliaceæ). The species are worthy of cultivation as fine foliage plants. Propagation, by cuttings, in sand, in a close case. Soil, equal parts loam and peat, with one-tenth sand.

Principal Species :—

acuminatum, 10′, My., grh. cl., yel., leaflets seven to eleven.

Brownii, 10′ to 15′, Je., st., wh., leaflets seven to eleven. Galapee Tree.

conicum, 10′, My., st., wh., red, leaflets seven to thirteen.

SCIADOPITYS. (Umbrella Pine.)

A handsome tree (*ord.* Coniferæ) for planting as a specimen upon the lawn. It may be employed to advantage in combination with other Conifers and evergreens in the mixed shrubberies. Although hardy, the Umbrella Pine has a great dislike to cold east winds when it is making young growth. Also it detests low-lying, swampy positions, for these are usually a good deal colder than those upon the higher ground. For propagation, *see* Picea and Pinus. Any fairly fertile soil will do, but one containing a good deal of leaf mould is best. Annual dressings of decayed leaves should be given. The plants are, however, naturally slow growing. Transplanting needs to be carefully performed, for even young trees dislike to be moved.

Principal Species :—

verticillata, 80′ to 120′, hdy., lvs. in bunches of thirty to forty, in whorls. Umbrella Pine.

SCILLA. (Squill, Wild Hyacinth.)

Valuable hardy, half-hardy, greenhouse, or stove bulbous plants (*ord.* Liliaceæ). The greater number are charming in the garden, in pots, or planted in grass. The spring-flowering species are prized, and the succession is kept up by hispanica, the large Spanish form of the native Bluebell or Wood Hyacinth (Scilla festalis, *syn.* nutans); while in warm borders or a frame several of the type of peruviana are ornamental in summer. In autumn the small-flowered autumnalis is pleasing. The squill of the apothecary is obtained from Urginea Scilla or maritima. Propagation, by offsets, taken when the bulbs are at rest, and by seeds, sown when ripe, if possible. Common soil will do for the greater number, but a light, rich one is best for the greenhouse and stove species and autumnalis.

Principal Species and Varieties :—

[Note.—All are hardy except where stated.]

bifolia, 4″ to 6″, Mch., bl.; many vars.
— alba, wh.
— Pink Beauty, deep ro.
— præcox, early.
— rosea, ro.
— taurica, large, bl.
— taurica alba, wh.
— White Queen.
— Whittallii, bl.
festalis. 9′ to 18″, Ap., bl. (*syns.* nutans and nonscripta); many vars., wh., ro., pk., or pur.
— cernua, bl., drooping habit.
hispanica, 1′, My., bl.; many vars. Spanish Squill.
— alba, wh.
— alba grandiflora.
— carnea, flesh.
— Emperor, porcelain striped bl.
— Empress, paler than above.
— rosea, ro.
— rubra, red.
nutans (*see* festalis).
peruviana, 6″ to 12″, My., lil.; warm border or frame.
— alba, wh.; warm border or frame.
— glabra, lil. (*syn.* Clusii); warm border or frame.
— Hughii, more robust, tinged red.
sibirica, 3″ to 6″, Feb., bl.
— alba, wh.
— uniflora, bl.

Other Species and Varieties :—

Adlami, 4″ to 5″, Ap., grh., mauve pur.
amœna, 3″, Mch., bl.
autumnalis, 3″, Aug., bl.
— japonica, pk.
Bellii, 4″, spr., bl.

Schubertia of Blume (*see Horsfieldia*).
Schubertia of Martius (*see Araujia*).
Sciadocalyx (*see Isoloma*).

bipartita, probably a form of lingulata.
Buchanani, 8″, My., grh., grn.
chinensis, 1′, Je., hlf-hdy., pale bl.
esculenta (*see* Camassia esculenta).
Galpini, sum., grh., mauve pur.
Hughii (*see* peruviana Hughii).
hyacinthoides, 1′ to 2′, Aug., bl., lil.
- stricta, erect pedicels.
italica, 6″ to 9″, My., pale bl.
- alba, wh.
Ledieni, 6″, grh., grn.
leucophylla, 1′, spr., pur.
Lilio - hyacinthus, 9″, sum., bl., pur.
— alba, wh.
lingulata, 2″ to 4″, spr., bl.
— alba, wh.
— lilacina, lil.
monophylla, 3″ to 6″, My., bl.
patula, 1′, My., bl.; several vars., wh., flesh, or ro.
polyantha, 9″, grh., pur.
pratensis, 2″ to 3″, My., bl.
puschkinioides, 4″ to 6″, spr., pale bl.
rigidifolia, 1½′, spr., grh., bl.
sub-secunda, 9″ to 12″, Je., grh., grn., br.
verna, 3″ to 9″, Ap., bl.

SCIRPUS.

A large genus of hardy, greeenhouse, or stove annual or perennial plants (*ord.* Cyperaceæ), of which only a few are valuable for gardens. Nodosus is largely used for conservatory decoration. Lacustris, Bullrush or Bast, is largely used for mats, chair bottoms, and similar purposes. Propagation, by seeds, divisions, or suckers. Boggy peat.

Principal Species and Varieties :—

Holoschœnus, 2′ to 3′, sum.
— variegatus, 1′ to 1½′, stems zoned wh., grn.
lacustris, 1′ to 8′, Jy., spikelets reddish br.
— Tabernæmontani, 2′ to 3′.
— zebrinus, 2′ to 3′, stems zoned wh., grn.
maritimus, 2′ to 5′, sum., spikelets br.
— variegatus, wh., grn.
nodosus, 4″, grn. (*syn.* Isolepis gracilis).
setaceus, 3″ to 6″, Jy., grn., br. (*syn.* Isolepis setacea).

Scolopendrium vulgare crispum (*see p.* 320).

SCINDAPSUS.

A small genus of tall, vigorous, climbing Aroids (*ord.* Aroideæ) with long, handsome leaves. They are, however, rarely grown, and are not of much importance. Propagation, by cuttings. Soil, fibrous loam and peat in equal parts, with a little sand and a few pieces of charcoal.

Principal Species :—

[Note.—s. = spathe, sp. = spadix.]

officinalis, 4′, My., st., s. grn., yel., sp. very thick, lvs. heart shaped.
pertusus (*see* Monstera deliciosa).
pictus, lvs. 4″ to 6″ long, oblique, spotted silver (*syns.* argyræus and Pothos argyræa). Silver Vine.

Sciadaphyllum (*see Sciadophyllum*).

SCISSORS.

Several kinds of scissors are in use by the gardener. Grape scissors are distinguished by their long handles and short, narrow, pointed blades, whose edges come into closest contact near the points. In making up buttonholes and bouquets scissors are indispensable for cutting the stems of flowers and ends of wire. Two sizes are needed for this work—a small, fairly light one for severing the fine binding wire, and another a good deal larger, and with stout, broad blades which will be equal to the task of cutting the stouter or "stub" wires employed where a stiff stem is needed. The edges of these scissors need not be very sharp, but they must be of well-tempered stuff, and the blades must work closely together.

A pair of scissors mounted on a 3′ or 4′ bamboo

pole is sometimes employed for gathering Roses and other flowers without stepping on the beds or borders. In this case the blades are worked by a stout steel wire running through the handle, and terminating in a ring near the end through which the operator's finger can be thrust. A patent grip attachment holds the flower after the stem has been severed.

For the large scissors used for hedge trimming and the clipping of grass verges, *see* SHEARS. For pruning scissors, see SÉCATEURS.

SCLERIA. (NUT RUSH.)

A genus of over 100 species (*ord.* Cyperaceæ), but of these very few are of any garden value. Culture as for CYPERUS, which *see*.

Principal Species :—

ciliata, 1½′ to 2′, sum., hdy., culms slender, spikes large.

verticillata, 6″ to 12″, sum., hdy., culms very slender, spikes small.

SCLEROCARPUS.

An obscure genus (*ord.* Compositæ) of greenhouse or half-hardy herbs, related to the Gymnolomias. The flower heads are yellow. Only one species, uniserialis, a half-hardy annual, 3′ to 4′, summer, yellow (*syns.* Gymnolomia uniserialis of gardens, and Gymnopsis uniserialis) is worthy of attention.

SCOLIOPUS.

Two species of hardy or half-hardy rhizomatous plants (*ord.* Liliaceæ). Allied to Medeola. The same culture as for Trillium is recommended.

Principal Species :—

Bigelovii, Feb., hdy. or hlf-hdy., pur., grn.; solitary.

SCOLOPENDRIUM. (HART'S TONGUE FERN.)

Description.—This genus of Ferns (*ord.* Filices) is a small one from one point of view, nine species only being recognised, but vulgare alone has proved itself possessed of such extraordinary versatility that hundreds of more or less distinct varieties are in common cultivation; there is, indeed, no single species of Ferns which passes through a wider range of variation. Stove, greenhouse, and hardy plants are all included, and many take kindly to the atmosphere of dwelling rooms. Varieties crested and crisped are to be had in all stages, and many of the best of them are quite constant. The genus includes Antigramme, Camptosorus, and Schaffneria.

Propagation.—By spores (for which *see* FERNS). The varieties of vulgare may best be multiplied by division of the crowns. A few produce bulbils upon the fronds, and if taken off and dibbled into sandy soil these soon make plants.

Soil.—A light but fairly rich soil is best, preferably of one part of sandy loam and two parts of leaf mould or peat. A few pieces of broken sandstone are an improvement.

Principal Species and its Varieties :—

[NOTE.—The dimensions and descriptions given apply to the fronds, except where otherwise stated. All hardy, unless marked to the contrary.]

vulgare, 6″ to 18″ long, 1½″ to 3″ broad, leathery, bright grn. (*syns.* officinale and officinalis); many vars., upwards of seventy being in the Kew collection. Burnt Weed, Christ's Hair, Common Hart's Tongue.
— acrocladon, 1′ long, narrow, branched at tips.
— bimarginatum, 6″ to 9″ long, ¼″ to ½″ broad.
— Claphamii, 1¼′ long, 2″ broad, margins crisped.
— Coolingii, fronds 4″ long, bushy, branching, proliferous.
— coronare, 9″ long, lobed on one side, margins wavy.
— crispum, 2″ broad, deeply waved or frilled (*see p.* 319). Many handsome sub-vars.; a few are Cowburni, densum, fimbriatum, grande, latum, majus, multifidum, reflexum, robustum, serratum, and Stansfieldii.
— Crista-galli, 12″ to 14″ long, 1½″ to 2½″ broad, margins crisped.
— cristatum, crested and tasselled. Cristato-digitatum is a sub-var.
— fimbriatum, fronds dimorphic, 6″ to 9″ long, ¼″ to ¾″ broad, fringed (*syn.* marginatum tenue of gardens).
— grandiceps, one of the best crested vars.
— Kelwayi, 2″ to 3″, long, branching.
— laceratum, 1′ long, summits crested (*syn.* endiviæfolium of gardens).
— marginatum, 2″ long, 1″ broad, erect. A few sub-vars. are marginato-irregulare, marginato-multiceps, marginato-lacerum, and marginato-triforme.
— omnilacerum, 18″ to 20″ long; truncatum is a sub-var.
— peraferens, fronds pouched.
— ramosum, much forked. Majus is larger.
— scalpturatum, 12″ long, 1″ to 1½″ broad, thick.
— submarginatum, 1½′ to 2′ long, cleft margins.
— undulatum, close to crispum; many sub-vars., including capitatum, cochleatum, marginatum, and reflexum.
— variegatum, fronds variegated. Claphamii and Elworthii are sub-vars.

Other Species :—

brasiliense, 6″ to 12″ long, 1″ to 1½″ broad, nearly entire, st. (*syn.* Antigramme brasiliense).
Durvillei, 6″ long, 1″ broad, entire or bipinnatifid, st.
Hemionitis, fronds arrow-head shaped, grh. Mule's Fern (now Asplenium hemionitis).
Krebsii, 1′ to 1½′ long, pinnate, grh. (correctly Lomaria punctulata).
nigripes, 1″ to 1½″ broad, thick, leathery, st.
officinale (*see* vulgare).
officinarum (*see* vulgare).
rhizophyllum, fronds root at tips, grh. Walking Fern, Walking Leaf.

SCOLYMUS.

Hardy annual, biennial, or perennial herbs (*ord.* Compositæ), with heads of yellow flowers and pinnatifid, often spiny leaves. Maculatus is effective as a foliage plant, for the white spots on the leaves are large and striking. The roots of hispanicus are as good as those of Scorzonera, and the people of Salamanca eat the leaves and stalks as Cardoons. The flowers are employed in the adulteration of saffron. Propagation, by seeds, sown in the open ground at any time during spring, and by root division. Any garden soil.

Principal Species :—

grandiflorus, 3′, My., hdy. per., yel., heads solitary.
hispanicus, 3′, Aug., hdy. bien., yel., spikes leafy, roots edible. Golden Thistle, Spanish Oyster Plant.
maculatus, 3′, Jy., hdy. ann., yel., lvs. much winged and heavily wh. spotted.

SCOLYTUS. (BARK BEETLES.)

A group of tiny Beetles which feed between the bark and the wood of various trees. The small size and cylindrical form are the distinguishing points, while the colour is some shade of grey or brown. Passages or burrows are formed by the beetles and the larvæ, and the pupæ pass the winter in the galleries made by the latter. Of the

Sclarea (*see Salvia*).
Sclerochamnus (*see Eutaxia*).

species of Scolytus the following are the most important: destructor (*syn.* Geoffroyi), upon the Elms; Ratzburgii, upon the Birch; and rugulosus, upon Apples, Pears, and Plums.

The genus Hyselinus, belonging to this group, has several injurious species, viz. crenatus and Fraxini, on the Ash; and Polygraphus angustatus, palliatus, ater, and piniperda, upon the Scotch Fir and other Conifers. Of the genus Bostrichus, domesticus attacks the Birch and Beech; and chalcographus, typographus, Laricis, saturalis, bidentatus, micrographus, lineatus, and cinereus, Conifers.

As a rule, the beetles chiefly affect dead or dying trees or branches, and it is easy, for the most part, to remove these. Or the bark may be pulled off and burned, a good time being towards the end of June.

Rugulosus is more troublesome, as it attacks young and ailing trees. Coating the trees with soft soap and petroleum worked into a stiff paste is helpful, but the removal of the badly infected trees is really the only true remedy.

SCOPOLIA (*syn.* SCOPOLINA).

Hardy, erect-growing, branching herbs (*ord.* Solanaceæ). Propagation, by division of the roots, preferably in autumn. A light, rather dry soil, in a partially shaded spot. (For Scopolia of Forster, *see* GRISELINIA.)

Principal Species and Variety :—

carniolica, 1′ to 1½″, Ap., hdy., lurid red, yel., or grn. inside (*syn.* Hyoscyamus Scopolia of *Botanical Magazine* 1126).
— concolor, pale yel., scentless (*syns.* hladnikiana and fladnichiana of gardens).
lurida, 4′ to 6′, Sep., hdy., grn., yel., then pur. (*syn.* Whitleya stramonifolia).

SCORCHING.

If exposed to the full effect of the sun's rays during the summer, plants under glass are apt to have parts of their leaves burnt or scorched. This is a great disfigurement, for the scorched pieces die and become brown patches, or they may drop out, leaving the leaves full of unsightly holes. With the exception of succulents, such as Agaves and Cacteæ generally, all plants are more or less liable to this scorching, and it is therefore necessary to provide the glasshouses with shade during the hottest part of the day. (*See also* SHADES.) Such tender subjects as Gloxinias, Tuberous Begonias, and Streptocarpuses, which have very tender leaves, will naturally burn or scorch much more quickly than such plants as Palms and Aspidistras, whose leaves are much tougher.

Scorching is aggravated by careless ventilation early in the morning, or by allowing the atmosphere of the house to become very dry at any time during the hours of sunshine. The temperature must be closely watched, air given as soon as the glass begins to rise freely, plenty of water thrown about the paths and stages, and shading applied. When shutting up the house in the afternoon scorching will not result, even although the sun be bright, if a copious syringing be given, and a moist atmosphere thus secured.

Scorching on Vines is frequently due to the fact that the temperature is allowed to fall very low during the night. A quantity of moisture is deposited upon the leaves, and these drops of water act as burning glasses next morning when the sun strikes down upon them before they have time to become dry. The remedy is to keep up the temperature of the house by night with fire heat, and to give air early in the morning, seeing that the shading of Vines is not usually practised. An excellent plan is to leave a little "top air" on the vineries all night, from the end of May onwards, according to the weather. Plant houses may well be treated in the same way.

Scorching was at one time largely brought about by imperfections in the glass employed in the houses. Now, good glass being so cheap, there is less probability that the glass is to blame. If plants scorch, the reason and the cure are to be sought for in some of the other points mentioned.

Watering outdoor plants overhead in bright weather during the hottest part of the day occasionally causes scorching, but not nearly so frequently as people imagine—that is, for leaves devoid of cavities wherein the water may collect.

SCORPIURUS.

Dwarf hardy herbs (*ord.* Leguminosæ), with yellow flowers and twisted pods. Vermiculata, the only cultivated species, is a trailing annual, increased by seeds. Any garden soil.

SCORZONERA.

Hardy herbaceous perennials (*ord.* Compositæ), almost the whole of which produce yellow flowers. Propagation, by seeds in spring, in any garden soil.

Culture as a Vegetable.—The value of the genus lies in Scorzonera hispanica, whose tap roots form a valuable change vegetable in winter. The soil should be deeply worked, but no manure added unless the ground be very poor, when quite decomposed manure may be incorporated with the second spit. Draw drills 12″ apart and ¾″ deep, sowing the seeds thinly early in April. Thin the plants as may be necessary until they stand 8″ asunder in the rows, when serviceable roots will develop by autumn. When the foliage dies down the roots may be lifted and stored, as advised for Carrots, which *see*; or they may remain in the ground and be drawn as required.

Principal Species :—

austriaca, 1′, Aug., yel.
graminifolia, 2′, Jy., yel.
hispanica, 3′, Jy., yel.
laciniata, 2′, Je., yel. (*syn.* Podospermum laciniatum).

SCOTCH KALE.

A tall-growing variety of Brassica oleracea, which being very hardy is valuable as a winter vegetable. (Full cultural directions are given under BORECOLE, which *see*.)

SCREENS.

It is frequently desirable that, either to hide some unpleasant view or shut out a too inquisitive public, live screens should be used. Sturdy young Poplars soon make a tall screen, as also do Limes. Wood trellises clothed with Ivy, evergreen Roses,

Scorodosma (*see Ferula*).
Scorpion Grass (*see Myosotis*).
Scorpion Senna (*Coronilla Emerus*).
Scorpius spinosus (*of Mœnch, Genista germanica*).
Scotch Asphodel (*Tofieldia palustris*).
Scotch Bluebell (*see Campanula rotundifolia*).
Scotch Bonnets (*Marasmius oreades*).
Scotch Crocus (*see Crocus biflorus*).
Scotch Laburnum (*Laburnum alpinum*).
Scotch Pine (*see Pinus sylvestris*).
Scotch Primrose (*see Primula scotica*).
Scotta (*see Bossiæa*).

Clematises, Hops, and many other strong, rambling subjects will provide screens in positions where trees cannot be planted, and most of these are also available for covering unsightly and bare walls. The homely Scarlet Runners, delightful Sweet Peas, and rampant Tropæolums are all good for lower screens than those already referred to, but they are only suitable for summer and autumn.

Screens for protective purposes are more used now than formerly, and it has been proved that screens of Poplars, Austrian Pines, or Damsons, planted on the cold, windward side of a somewhat exposed orchard, give shelter at the time it is most needed. In the case of wall fruit trees, especially those that flower very early, a canvas screen is of service to keep sunshine from the bloom buds, and so retard them as much as possible, but at a later date, after the flowers have opened, canvas screens or fish netting doubled serve to guard from frost at night ; if the former is used it must be drawn aside by day.

SCROPHULARIA. (Figwort.)

A numerous but, for garden purposes, almost valueless, genus of hardy annual, biennial, or perennial plants (*ord.* Scrophularineæ). Propagation, by seeds and division. Common soil.

Principal Species :—

aquatica variegata, 2′, sum., hdy. per., lvs. grn., wh.
chrysantha, 6″ to 15″, Mch., hlf-hdy. bien., yel.

SCUTELLARIA.

Hardy and tender perennials (*ord.* Labiatæ). There are a good many species in the genus, but comparatively few are generally cultivated. Propagation, by seeds and division in the spring for the herbaceous species, by cuttings in sandy soil for the evergreens, and in heat for tender ones. Soil, common garden, if well drained, for the hardy species, and a compost of loam two parts, leaf mould one part, and sand and dried cow manure half a part each for the tender species after the cutting stage is passed.

Principal Species and Varieties :—

alpina, 8″, Aug., hdy. herbaceous, pur. ; lupulina is a yel., and sanguinea a red var.
coccinea, 1½′, sum., st., sc.
galericulata, 1′, Jy., hdy., bl.
Hartwegii, 2′, sum., st., vio. bl.
mociniana, 1½′ to 4′, sum., st., sc. yel.
lateriflora, 1′, Jy., hdy., bl.

Other Species :—

caicalensis, 9″, Aug., bl. (*syn.* macrantha).
Columnæ, 1½′, Jy., hdy., bl.
incarnata, 1½′, Aug., grh. ev., ro.
javanensis, 1½′, sum., grh., vio. bl.
Lehmanni, 2′, sum., st., sc.
macrantha (*see* caicalensis.
minor, 6″, Jy., hdy., pk.
orientalis, 1′, Aug., hdy., yel.
Trianæi, 1½′, aut., grh., rosy sc.
Ventenatii, 2′, Aug., grh., sc.

SCUTICARIA.

Stove Orchids (*ord.* Orchidaceæ) of very distinct habit. The plants grow best head downwards, attached to a block of Teak, with a little peat and sphagnum about the roots. Water sparingly during the resting season.

Screw Pine (*see Pandanus*).
Scrubby Oak (*Lophira alata*).
Scrub Oak (*Quercus Catesbæi*).
Scurvy Grass (*see Cochlearia officinalis*).

Principal Species :—

Hadweni, lvs. 9″ to 18″ long, sum., yel., grn., br., wh.
Steelii, lvs. 2′ to 4′ long, yel., spotted br., lip or. yel., crim.

SCYTHE.

There was a time when the whole of the grass mowing of the garden and field was done by the scythe, but the mowing machines of the day have ousted the older instrument. Now the scythe is used in the garden for cutting the grass in the wilderness and wild garden, and for mowing the first growth that comes from Grass seeds on newly made lawns. The disadvantage of the scythe is that, except in very skilful hands, lines are left at more or less regular intervals throughout the Grass.

SEAFORTHIA.

Tall-growing, handsome stove Palms (*ord.* Palmæ). For culture, *see* Palms.

Principal Species :—

Alexandræ (now Archontophœnix Alexandræ).
coronata (now Pinanga coronata).
elegans (*syn.* Ptychosperma cunninghamiana, now Archontophœnix Cunninghamii).
Kuhlii (now Pinanga Kuhlii).
malayana (now Pinanga malayana).

SEAKALE.

Description.—A very delicious vegetable (Crambe maritima, *ord.* Cruciferæ), whose leafstalks when blanched are universally appreciated.

Propagation.—By seeds sown in rich soil in March and April. If the plants are to be moved the seeds should be in drills 1′ asunder, but if they are to remain where sown they should be in thin patches 2½′ apart. Also, and more generally, by the whip-like roots secured when the stock is lifted for forcing.

Making Up Beds.—This may be done from plants raised in seed beds, or by purchased roots, the latter giving a gain of one year or more according to the age of the roots. The ground can scarcely be made too rich with natural manure, as the plants are very gross feeders. As the roots are lifted for forcing, the whip-like roots, when trimmed off, may be employed for making fresh beds.

Forcing.—There is no vegetable easier to force than Seakale, and the simplest manner is to cover the clumps with 1′ of earth ; or they may be covered with leaves and long litter. The best method is to cover the clumps with Seakale pots or tubs, surrounding and covering these with leaves or thoroughly decomposed manure, long litter being used as a final covering in both cases. Rank, fresh manure should not be employed, as the heating will be too violent. This mode of forcing provides the finest flavoured produce, but earlier may be secured by lifting and forcing under cover. Any place that is quite dark will suit. The temperature should not exceed 55° if the finest flavour is desired. The roots should be packed in light soil, leaves, or Mushroom bed refuse, and the produce will be ready in from five to eight weeks.

Scyphœa (*see Marila*).
Scyphanthus (*see Grammatocarpus*).
Sea Buckthorn (*see Hippophae rhamnoides*).
Sea Heath (*see Frankenia lævis*).
Sea Holly (*see Eryngium maritimum*).
Sea Lavender (*see Statice Limonium*).
Sea Onion (*Urginea maritima*).
Sea Ragwort (*Senecio Cineraria*).

Harder forcing results in deficiency of flavour. Roots forced in this manner should be thrown away, as the process is very exhausting.

Principal Varieties :—

Beddard's Improved. Lily White. Purple.

SEASIDE PLANTS (*see* SHRUBS).

SEATS.

These are essential in many parts of the garden, and should be as far as possible in keeping with the surroundings. For the wilder parts, rustic seats may be used (*see* RUSTIC WORK). Folding iron seats are useful for lawns, those with awnings being the best. Stone seats, whilst very ornamental when covered with Lichens and age, are objectionable owing to the cold. Corners in walls may be used, covering with rustic roofs, or simply rafters covered with climbing Roses, Hops, Honeysuckles, Vines, etc.

SEAWEED.

Many of the commoner seaweeds have a distinct value as manure, and are used freely as such on farms and gardens near the coast. In potash and soda salts the long Ribbon-weed and the Bladder Wrack are particularly rich, and consequently they are useful alike for Potatoes and Turnips, especially the former. As Seaweeds are poor in phosphates, some bone meal or other phosphatic fertiliser should be used on land manured with them.

Seaside Balsam (*Croton Eleuteria*).
Seaside Grape (*see Coccoloba*).
Seaside Laurel (*Phyllanthus latifolius*).

SEBÆA.

Greenhouse annuals (*ord.* Gentianeæ). Propagation, by seeds in light soil in early spring over a gentle hotbed, the seedlings being pricked off and potted as necessary. Soil, any ordinary potting mixture.

Principal Species :—

albens, 6″, Aug., wh. aurea, 6″, Jy., yel.
ovata, 6″, Aug., or. red.

SECAMONE.

Evergreen stove twiners (*ord.* Asclepiadeæ). Propagation, by cuttings of side shoots in sandy peat, beneath a bell-glass, over bottom heat. Soil, three parts fibrous peat and one part leaf mould, with coarse sand.

Principal Species :—

ægyptiaca, 6′, Jy., wh. (now Oxystelma esculentum by *Index Kewensis*).
elliptica, 6′, sum., wh.
emetica, 6′, sum., wh.

SÉCATEUR.

A form of small hand shears used in pruning, very useful for quick work in trimming moderate sized shoots, and if kept sharp and used properly making a sufficiently clean cut.

SECHIUM. (CHACO.)

Half-hardy annuals (*ord.* Cucurbitaceæ), with rough-skinned, Gourd-like fruits. An attempt was made a few years back to popularise edulé in this country as a vegetable, its huge fleshy roots resembling Yams when cooked, but it met with

Secale cereale (*see Tilletia*).

Photo: W. Rossiter, Bath.

SEDUM ALBUM (*see p.* 324).

comparatively little success. Propagation, by seeds, in heat. The plants should be grown in a warm pit, or in light, rich soil out of doors during summer and autumn.

Only Species :—

edule, 6′ to 12′, Je., yel.

SECURIDACA.

Little grown stove shrubs (*ord.* Polygaleæ), generally of climbing habit. Propagation, by cuttings, in heat, under a glass, in sand. Soil, loam, peat, and sand.

Principal Species :—

erecta, 10′ to 15′, Jy., red.
virgata, Jy., cl., yel., ro., wh.

SECURIGERA. (Axe-Weed and Hatchet Vetch.)

Coronilla, 1′, July, yellow, is a hardy annual, increased by seeds, and growing in any ordinary garden soil.

SECURINEGA.

Few of these stove, greenhouse, or hardy shrubs (*ord.* Euphorbiaceæ) are in cultivation. Propagation, by cuttings of half-ripe wood, struck under glass, in heat. Common soil.

Principal Species :—

durissima, 35′, Je., st., wh. (*syns.* Commersonii and nitida of Willd.). Otaheite Myrtle.

SEDUM. (Stonecrop.)

A large genus of annual or perennial herbs or sub-shrubs (*ord.* Crassulaceæ), of fleshy habit and of much service for dry borders, rockeries, walls, or roofs. The taller-growing species are good border or pot plants, while a few of the closest-growing are valued for carpeting taller plants or for carpet bedding. Propagation, by cuttings, which should be left for some hours after being cut, to dry before being inserted in sandy soil; by seeds sown under glass in spring, and in most cases by division in spring or summer. Common soil. Many will grow in or on walls with hardly any earth. A little lime is beneficial.

Principal Species and Varieties :—

[Note.—All hardy perennials, except where stated.]

acre, 2″ to 3″, sum., yel.; vars. aureum, tips yel. in spr.; elegans, tips silvery; majus, larger.
album, 4″ to 6″, sum., wh. (*syns.* farinosum of gardens and neglectum, *see p.* 323).
— brevifolium, lvs. shorter and thicker.
brevifolium, 2″, Jy., wh.; suffers in win. from rain.
— Pottsii, prettier foliage.
cæruleum, 2″ to 3″, Jy., ann., pale bl.
Ewersii, 6″, Aug., pk.
— turkestanicum, red.
hispanicum, 3″ to 4″, Jy., pk., wh. (*syn.* glaucum).
japonicum, sum., spreading, yel.
kamtschaticum, 4″ to 6″, aut., yel. (*syn.* selskianum of gardens).
ibericum, yel.
lydium, 3″, sum., pk. (*syn.* lividum of gardens).
maximum, 1′ to 2′, Aug., wh., red.; several vars.
reflexum, 8″ to 10″, sum., yel.; several vars., cristatum is the most distinct.
rupestrum, 9″, sum., yel.
— monstrosum, yel.
Sieboldii, 9″ to 12″, Aug., tender in some places, pk.
— medio-pictum, lvs. with wh. blotch.
spectabile, 1½′ to 2′, Sep., pk.
stoloniferum, 6″, Jy., pk. (*syn.* spurium).
— album, wh.
— splendens, bright red.

Other Species and Varieties :—

Aizoon, 1′, spr., sum., yel.
Alberti, Jy., trailer, wh.
albo-roseum, 1½′, sum., wh.
altissimum, 1′, Je., yel. (*syn.* ochroleucum).
amplexicaule, 6″ to 9″, sum., yel.
Anacampseros, Jy., pur.
anglicum, 2″, Jy., wh.
anopetalum, 6″, Jy., greenish yel.; var. Verloti.
arboreum, 4″ to 6″, Jy., tender, wh.
asiaticum, 6″ to 12″, sum., grn., yel.
beyrichianum, 3″, sum., grh., wh.
corsicum (*see* dasyphyllum var. and maximum).
dasyphyllum, 2″ to 3″, Jy., pk.
— glanduliferum, hairy (*syn.* corsicum, Duby).
dendroideum, Je., grh., yel. (*syn.* assoideum).
— variegatum, lvs. variegated.
dentatum, 6″, sum., pk.
ebracteatum, 1′, sum., grh., yellowish wh.
Fabaria (*see* Telephium).
glaucum (*see* hispanicum).
hybridum, 1′, sum., yel.
Maximowiczii, 1′, sum., yel.; probably a var. of Aizoon.
middendorfianum, 1′, sum., yel.
monregalense, 4″, sum., wh.
nicæense, 9″ to 12″, sum., greenish yel.
obtusifolium, 3″, sum., wh.
oppositifolium, 6″, Jy., trailer, wh.
oreganum, sum., ro.
pallidum, 2″ to 5″, Jy, wh. or pk.
populifolium, 6″ to 10″, Aug., wh. or pk.
pruinatum, 1′, sum., yel. (*syn.* elegans).
— fosterianum, lvs. of barren shoots in rosettes (*syn.* rupestre fosterianum).
pulchellum, 6″, sum., rosy pur.
roseum, 9″ to 12″, sum., grn. or reddish pur. (*syns.* Rhodiola and R. rosea); linifolium, ovatum, rubrum, and Stepheni are vars.
sarmentosum, sum., grh., yel.
— variegatum, lvs. striped wh., stems pk. (*syn.* carneum variegatum).
selskianum, 1½′, sum., yel.
selskianum of gardens (*see* kamtschaticum).
Semenovii, 1′, Je., wh.
sexangulare, 3″, Jy., yel.
spathulifolium, 4″, Je., tender, yel.
telephioides, 6″ to 12″, Je., pk.
— hæmatodes, 2½′, sum., wh., red.
Telephium, 1′ to 1½′, sum., pk., pur., or wh.; many vars., including Fabaria.
trifidum, 3″ to 8″, Jy., red.

SEEDLINGS.

Young plants raised from seeds are generally more robust and vigorous than those from divisions or cuttings. In some cases—though not invariably—they also bloom more freely. Natural species generally reproduce themselves true from seeds, but florists' varieties are not to be relied upon to do so, though constant selection has done much towards "fixing" the colours in the varieties of some plants largely raised from seeds.

Seedlings require great care in their early stages. If they come up too thickly or are improperly watered or aired they damp off. If exposed to strong sun they wither; if too deeply shaded they grow weakly. If under glass they ought to be kept near it, shaded from strong sun, and given air, without draughts. Watering should be carefully done, always seeing that the surface alone is not damp while the subsoil is dry. This is a fruitful source of damping off. With small seedlings of a delicate nature, it is often best to immerse the pot partially in water and allow the water to rise through the soil until it begins to percolate through the surface, when the pot may be removed from the water. Seedlings in the open should be shaded from strong sun. When seedlings have made one pair or so of rough leaves (those formed after the first or seed leaves) they should be pricked out a short distance apart and watered and shaded for a few days.

SEED ROOM.

It is a matter of great consequence that the apartment in which seeds are kept until required for sowing should be both suitable and conveniently fitted up. The first essentials are that it should be

SELAGINELLA BRAUNII (*see p.* 326).

perfectly dry, and capable of being properly aired. A close, damp room causes either decay or premature germination. The room should be fitted up with cases containing drawers and shelves, and, for the preservation of some seeds, bottles with air-tight capsules are very convenient.

SEEMANNIA.

Ternifolia, 3′ to 4′, winter, scarlet (*syn.* silvatica), the principal species, is an interesting stove perennial (*ord.* Gesneraceæ), closely related to Achimenes and Isoloma. Propagation, by seeds, sown in pots of fibrous loam or leaf soil, with sand and peat, and put in a temperature of about 70°; or by division of the creeping rhizome. Soil, loam, sand, and peat.

SELAGINELLA.

Description.—Upwards of 300 species are included in this large and important genus (*ord.* Selagineæ), but of these only between sixty and seventy are in cultivation. Many are exceedingly elegant and useful plants.

Stove, greenhouse, and hardy evergreen plants are all included, but there is a good deal of variation in the habit and general appearance of the plants.

Propagation.—By cuttings of the creeping stems at any time except winter, when the cuttings are apt to damp off. Also by layers, the shoots being simply pegged down and severed when rooted. In choosing cuttings take the tips of main stems, if possible, not exhausted side branches, and discard any that are showing the little "cones" or fruits.

Soil.—Almost any light, rich soil will do, but it should contain a heavy proportion of sand. Equal parts of loam and leaf mould, with sand and a few pieces of charcoal, answer. Peat may be substituted for the leaf mould, and it should be fibrous in the case of grandis, which also requires to be enclosed in a case to do really well.

Other Cultural Points.—The stove and greenhouse species like a close, uniformly moist atmosphere. A good deal of water will be needed in spring, summer, and early autumn, but watering must be very carefully done in winter. For the trailing species particularly broad, shallow pans, rather deeper at the back than the front, are preferable to pots, as a good deal of rooting surface is required, with comparatively little soil. Examples are to be found in kraussiana and its varieties, bakeriana, serpens, and uncinata. Even the erect growers do well in these pans. Uncinata and bakeriana are excellent for baskets or rustic woodwork. Galeottei makes a superb mass of greenery in a hanging basket in a large house. Martensii and its varieties are at home upon rockwork in warm houses. Willdenovii is at its best upon a trellis, and kraussiana comes in handily for planting beneath plant house stages. Its varieties do better in small pots (60's) and are very handy for furnishing. Apus and emiliana also come in this category. In almost all cases no repotting is needed—Selaginellas transplant badly—the cuttings being simply dibbled into the pans which are

SELAGINELLA CUSPIDATA EMILIANA (*see p.* 326).

to be their permanent quarters. Watering overhead must never be attempted; the plants detest it. Of manurial stimulants liquid cow manure is best, but it should be given only in the height of the growing season.

Principal Species and Varieties :—

[NOTE.—s. = fruiting spikes or cones.]

albonitens, slender, trailing, freely pinnate, lvs. spear shaped, s. ¼″ to ½″ long, grh.

apus, stems 1″ to 4″ long, simple or forked, tufted, s. ¼″ to ½″ long, grh. or st. (*syns.* apoda and densa of gardens); useful for small vases.

atroviridis, stems 1′ long, flattened on back, lvs. rounded, s. ½″ to 1″ long, square, st.

bakeriana, trailing, s. 1″ to 2″ long, grh. (*syn.* leptostachya).

Braunii, stems 1′ to 1½′ long, erect, much divided, s. short and square, grh. (*syns.* Willdenovii of gardens, not Baker, and pubescens of gardens; *see p.* 325).

canaliculata, stems creeping, side branches 4″ to 6″ long, lvs. pointed, s. ½″ to 1″ long, st. (*syns.* caudata, chinensis, conferta, and sinensis of gardens).

caulescens, stems 6″ to 12″, erect, lvs. sharp pointed, s. ¼″ to ½″ long, square, st.

— amœna, stems 1′ long, triangular, pinnate, st.; a good room plant.

— argentea, lvs. whitish grn. beneath, st.

— minor, stems 4″ high, less divided, st. or warm grh. (*syn.* japonica).

cuspidata, stems 6″ long, branching, lvs. egg shaped, pointed, greenish wh., s. ¼″ to ½″ long, square, st.

— crispa, stems crisped, st.

— elongata, stems 1′ long, less branching.

— emiliana, stems 6″ to 9″, erect, much branched, horizontal when older, st. (*syn.* emiliana of gardens); very useful, good for small pots (*see p.* 325).

erythropus, stems 6″ long, bright crim., branching, s. square, st. (*syn.* umbrosa of gardens).

— major, stems more compound, lvs. adpressed, st.

— setosa, a small, starved form.

Galeottei, stems 1′ to 2′ long, s. ¼″ to ½″ long, square, st.; elegant for large baskets.

— gracilis, stems 2′ to 3′ long, pinnately branched, s. ½″ to 1″ long, square, st.

grandis, stems 1½′ to 2′ long, branching, like a miniature tree, but very feathery, lvs. spear shaped, s. 1″ to 1½″ long, tail-like, st.; best in a close case.

hæmatodes, stems 1′ to 2′ long, erect, bright crim., feathery, s. 1″ to 1½″ long, square, st. (*syn.* filicina).

inæqualifolia, stems 3′ to 4′ long, branches 6″ long, s. ¼′ to ½′ long, square, st.

— perelegans, stems and pinnæ shorter, s. 1″ long, st.; more elegant than type (*syn.* bellula of Moore).

kraussiana, stems 6″ to 12″ long, trailing, s. short and square, st. or grh.; the most useful (*syns.* denticulata of gardens, not Link, and Lycopodium denticulatum). Several vars. including:

— aurea, grn., golden, st. or warm grh.

— Brownii, dwarf, warm grh.

— Stansfieldii, stems much constricted, tufted, grh.

— variegata, grn., wh., warm grh.

lepidophylla, stems 2″ to 4″ long, branching, tufted, lvs. reddish brn. when old, s. ¼″ to ½″ long, square, st. or grh. Resurrection Club Moss.

Martensii, stems 6″ to 12″, branching, erect, bearing many root fibres, warm grh. or st.; one of the most useful (*see p.* 327).

— divaricata, less branching, smaller, lvs. pale grn., warm grh. or grh.

— formosa, more slender in habit, st.

— stolonifera, stems very upright, st.

— variegata, lvs. and stems blotched creamy wh., st.

oregana, stems 1′ long, pendent, branching, s. square, grh.

Poulteri, s. ¼″ to 1″ long, grh.; more robust.

tassellata, stems erect, fleshy, branching, s. pendent, long, square, st.; an elegant plant.

uncinata, stems 1′ to 2′ long, trailing, lvs. bluish grn., s. ¼″ to ½″ long, square, st. or grh. (*syn.* cæsia of gardens; *see p.* 327).

Wallichii, stems 2′ to 3′ long, bipinnate, s. 1″ long, square, st.

Willdenovii (of Baker, not of gardens) stems 20′ to 25′, climbing, branches 1′ to 2′ long, lvs. metallic bl., s. ½″ to 1″ long, square, st. (*syns.* cæsia) arborea and lævigata of gardens.

Other Species and Varieties:—

affinis, stems 12″ to 15″ long, trailing, branching, s. ¼″ to ½″ long, st. (*syn.* rigida of gardens).

africana (*see* Vogelii).

amœna (*see* caulescens var.).

apoda (*see* apus).

argentea (*see* caulescens var.).

bellula (*see* inæqualifolia perelegans).

Brownii (*see* kraussiana var.).

cæsia (of gardens, *see* uncinata).

— arborea (*see* Willdenovii).

caudata (*see* canaliculata).

chinensis (*see* canaliculata).

cognata (*see* Lobbii).

convoluta, stems 3″ to 6″ long, branching to base, tufted, s. ¼″ to ½″ long, square, st.

delicatissima, stems thread-like and trailing, branching, grh.

densa (*see* apus).

denticulata, close to helvetica but has s. square, grh. This is the denticulata of Link, not of gardens, for which *see* kraussiana.

dichroa (*see* Vogelii var.).

divaricata (*see* Martensii var.).

Douglasii, stems 3″ to 6″ long, forked, s. ½″ to 1″ long, hlf-hdy.

elongata (*see* cuspidata var.).

emiliana (of gardens, *see* cuspidata var.).

filicina (*see* hæmatodes).

flabellata, stems 1′ to 2′ long, erect, sharp pointed, s. ½″ to 1″ long, square, st.

flagellifera (*see* plumosa var.).

flagelliformis (of gardens, *see* plumosa).

flexuosa, stems 1′ long, branching, flattened at back, s. ½″ to 1″ long, square, st.

formosa (*see* Martensii var.

fulcrata, stems 1½′ to 2′, erect, branching, s. ¼″ to ½″ long, square, grh., st.

Griffithii, stems 6″ to 12″, erect, branching, s. ¼″ to ½″ long, square, st.

helvetica, stems 2″ to 3″, matted, trailing, s. ½″ to 1″ long, cylindrical, hdy. (*syn.* Lycopodium helveticum, Linnæus).

involvens, stems 2″ to 6″ long, twice or thrice divided, tufted, warm grh.; pretty but rare.

— texta, stems less compound (*syn.* texta).

— variegata, branches creamy wh., st.

lævigata, stems 1′ to 1½′ long, branching, s. ½″ to 1″ long, square, st.

lævigata (of commerce, *see* Willdenovii).

— Lyallii, fronds more divided, s. shorter but larger.

leptostachya (*see* bakeriana).

Lobbii, stems 3′ to 4′ long, subscandent, s. square (*syn.* cognata).

ludoviciana, close to apus (*syn.* apus denticulata).

Lyallii (*see* lævigata var.).

Mettenii, stems trailing, slender, grh.

molliceps, stems 6″, pale red, much divided, erect, s. ¼″ to ½″ long, twisted, st.

mutabilis (of gardens, *see* serpens).

patula, like serpens, but has a whip-like tip to branches, warm grh.

perelegans (*see* inæqualifolia var.).

pilifera, stems 3″ to 4″, branching, tufted, grh.

plumosa, stems 6″ to 12″, branching, trailing, s. ¼″ to ½″ long, square, st. (*syn.* flagelliformis of gardens).

— flagellifera, whip-like tips to branches, st.; an elegant plant.

pœppigiana, stems 1′ to 2′ long, trailing, much branched, s. ¼″ to ½″ long, square, grh.

radiata, stems 6″ to 12″ long, slender, sub-erect, branching, s. ¼″ to ½″ long, square (*syn.* Warscewiczii).

rigida (of gardens, *see* affinis).

rubella, stems 1′, erect, branching, brownish red, lvs. red when old, s. ½″ to 1″ long, square, grh.

serpens, stems 6″ to 9″ long, branching freely, trailing, s. ¼″ to ½″ long, square, st. (*syn.* mutabilis of gardens).

setosa, a starved form of erythropus.

sinensis (of gardens, *see* canaliculata).

texta (*see* involvens var.).

umbrosa (of gardens, *see* erythropus).

Victoriæ, stems 3′ to 4′ long, branching, s. 1″ to 2″ long, square, st.; handsome, but rare.

viridangula, stems 3′ to 4′ long, branches 1′ long, s. 1″ to 2″ long, square, st.

viticulosa, stems 6″ long, divided, triangular, s. short, square.
Vogelii, stems 1′ to 2′ long, divided upward, erect, lvs. often pk., s. ¼″ to ½″ long, square; dichroa is a var.
Warscewiczii (*see* radiata).

Selaginella Martensii (*see p.* 326).

SELAGO.

Annual herbs, shrubs, and sub-shrubs (*ord.* Selagineæ), suitable for the greenhouse or for planting out in summer in warm positions. Propagation, by cuttings of half-ripened wood in bottom heat, under a glass. Soil, loam and leaf soil with a little sand.

Principal Species:—

corymbosa, 2′, sum., wh.
distans, 1′, sum., wh.
fruticosa of Linnæus, 1′, sum., yel.
myrtifolia, 6″, sum., pk. (*syn.* Gillii).
rotundifolia, 1′, sum., pur.
serrata, 1′, sum., bl. (*syn.* fasciculata).
spuria, 2′, sum., vio. (*syn.* rapunculoides).

SELENIA.

Little cultivated hardy annuals (*ord.* Cruciferæ), deserving more attention from growers. They have pretty, finely divided leaves and racemes of flowers. (For culture, *see* Hardy Annuals.)

Principal Species:—

aurea, 9′, Je., yel.

SELENIPEDIUM.

This is one of the sections into which botanists have divided the large genus Cypripedium (*ord.* Orchidaceæ). In this work the latter genus is adhered to in its entirety, but it may here be stated that the section Selenipedium differs from the true Cypripedium in a few particulars. Selenipediums are all American, they have bright green leaves, which are mostly long and slender; the flower scapes are longer than in the Cypripediums, jointed, and bracteate; and, as the flowers open successively, the flowering season is extended.

The principal species belonging to this section are boisserianum, caricinum, caudatum, lindleyanum, longifolium, sargentianum, and Schlimii; and the principal hybrids are Ainsworthii, albo-purpureum, cardinale, calurum, conchiferum, dominianum, grande, leucorrhodum, Schröderæ, Sedenii, suave, and Titanum.

SELINUM (*syns.* Cnidium and Mylinum).

Chiefly hardy, branching herbs (*ord.* Umbelliferæ), with white or yellowish green flowers and finely cut leaves. Of no garden value, and rarely, if ever, grown.

SEMECARPUS.

Stove evergreen trees (*ord.* Anacardiaceæ) with small flowers, succeeded by nuts or berries, the juice of which is used by the natives of Ceylon and tropical Asia for marking cotton cloth. Propagation, by cuttings of ripe shoots under a bell-glass in sand and in heat. Soil, loam, peat, leaf mould, and sand.

Principal Species and Variety:—

Anacardium, 50′, Jy., greenish yel. Malacca Kidney Bean.
— cuneifolium, lvs. wedge shaped.

SEMEIANDRA.

Grandiflora, 6′, March, scarlet, the only species, is a slender greenhouse shrub (*ord.* Onagrariæ) with handsome flowers, nearly related to the Fuchsia, and requiring similar cultivation. (*See* Fuchsia.)

SEMELE.

A genus of one species, androgyna (*syn.* Ruscus androgyna, *ord.* Liliaceæ). It is a greenhouse

Selaginella uncinata (*syn.* Cæsia of gardens: *see p.* 326).

climber, 30′ to 40′, with small, greenish white flowers, succeeded by red berries. Propagation, by

Self Heal (*see Prunella vulgaris*).
Selliguea (*see Gymnogramme*).

seeds and division. Soil, rich loam and sand. The young shoots may be used as a substitute for Asparagus.

SEMPERVIVUM. (HOUSELEEK.)

A large genus of hardy or greenhouse herbs or sub-shrubs (*ord.* Crassulaceæ) with succulent leaves, which adapt them to living in the most arid situations. The hardy species are suitable for edgings, rockwork, old walls, and roofs, while some of the greenhouse species make interesting pot plants for the window or for bedding in summer. The nomenclature of the genus is in a confused state in gardens on account of the difficulty of determining many of the species. Propagation, by seeds sown under glass in spring, or by offsets. Sandy soil, with a little old mortar or lime rubbish. They flower best in full sun.

Principal Species and Varieties :—

[NOTE.—All hardy except where otherwise stated.]

arachnoideum, 4″, Je., red. Cobweb Houseleek.
— barbulatum, 4″, sum., ro. (*syn.* barbulatum).
— doëllianum, 4″ to 6″, Je., bright red (*syn.* doëllianum).
— Fauconnetti, 6″ to 8″, sum., red (*syn.* Fauconnetti).
— Hausmanni, 6″, sum., red (*syn.* Hausmanni).
— Laggeri, 6″, Je., red; fine form (*syn.* Laggeri).
— piliferum, 4″, Je., red (*syn.* piliferum).
— webbianum, 4″ to 6″, Je., red (*syn.* webbianum).
arenarium, 6″ to 9″, sum., pale yel.
— Neilrichii (*syn.* Neilrichii).
glaucum, 6″ to 12″, sum., red.
— acuminatum, 9″, sum., red.
— Schlehani, 9″, sum., red.
— Schottii, 1′, sum., red.
globiferum, 3″ to 5″, sum., pale yel.
— grandiflorum, 3″ to 4″, sum., yel. (*syn.* grandiflorum).
— soboliferum, 6″ to 9″, sum., pale yel. (*syns.* soboliferum and hirtum of Jacquin).
montanum, 6″, Je., pur.
tabulæforme, 1′, Je., grh., yel.
— variegatum, lvs. variegated.
Tectorum, 1′, Jy., pale red. Common Houseleek, Sengreen, etc.
— Lamottei, 1′, sum., pk. (*syn.* Lamottei).
— parvulum, 6″ to 12″, sum., pale red.
— Reginæ Amaliæ, 6″, sum., pale yel. (*syn.* Reginæ Amaliæ).
— rusticanum, 1′, sum., reddish wh. (*syns.* Requieni of gardens, etc.).
triste, 1, sum., red.

Other Species and Varieties :—

arboreum, 3′ to 6′, sum., grh., yel.
— atropurpureum, foliage pur.
— variegatum, lvs. margined cream.
arvernense, 6″ to 8″, sum., pk.
atlanticum, 1′, sum., pale red.
Boissieri, 9″, Jy., red.
boutignyanum, 6″ to 8″, sum., ro.
Braunii, 6″ to 9″, Jy., yel.
calcareum, 10″ to 12″, sum., pale red (*syn.* californicum of gardens).
canariense, 1½′, Je., grh. shr., wh.
fimbriatum, 6″ to 9″, Jy., red.
flagelliforme, 4″, Je., red.
Funckii, 6″ to 9″, Jy., reddish pur.
glutinosum, 2′, Jy., grh. shr., yel.
hirtum, 6″ to 9″, Je. pale yel.
holochrysum, Dec., grh., yel.
Lindleyi, 6″ to 9″, Je., grh. shr., yel. (*syn.* villosum).
mettenianum, 4″ to 6″, sum., rosy wh.
Moggridgei, 9″, Sep., red.
Monanthes (now Monanthes polyphylla).
Paivæ, Aug., grh., low shr., grn.
parvulum, 6″ to 12″, Jy., pale red.
patens, 6″, sum., yel.
— Heuffelii, 6″ to 8″, Aug., pale yel.
Pittonii, 4″ to 6″, Jy., pale yel.
Pomellii, 6″ to 9″, Jy., rosy red.
Royeni, 1′, sum., reddish wh.
ruthenicum, 6″ to 12″, pale yel.
Schnittspahni, 6″ to 9″, sum., yel.
soboliferum (*see* globiferum var. soboliferum).
Verloti, 6″ to 9″, Jy., rosy red (*syn.* Pomellii Verloti).
violaceum, 1′, sum., red.
Wulfeni, 6″ to 9″, sum., yel.
youngianum, 3′, Je., grh. shr., yel.

SENECIO. (RAGWEED, GROUNDSEL.)

A very large genus of annual, biennial, or perennial stove, greenhouse, or hardy plants (*ord.* Compositæ), of herbaceous, sub-shrubby, or shrubby habit. Many of the plants called by botanists Senecios have other garden names, which are used in this work, and only a small number of the many true Senecios of gardens can be given here. Propagation, the annuals by seeds; the perennials by seeds, division, or cuttings. Any common soil of a loamy nature. (*See also* CINERARIA, KLEINIA, and LIGULARIA.)

Principal Species :—

argenteus, 1′ to 2′, sum., grh. sub-shr., yel.
chordifolius, 1′, Jy., grh. sub-shr., yel.
Doronicum, 1′, sum., hdy. per., yel.
— transylvanicus, yel.
elegans, 1′ to 2′, sum., hlf-hdy. ann., pur.; double vars. in various colours (*syn.* Jacobæa elegans).
grandifolius, 10′ to 15′, sum., hlf-hdy. shr., yel. (*syn.* Ghiesbreghtii).
Heritieri, spr., grh. shr., pur., wh. (*syns.* Cineraria aurita and C. lanata).
incanus, 3″ to 6″, Aug., hdy. per., yel.
macroglossus, sum., grh. cl., pale yel. Cape Ivy.
macrophyllus, 6′, Aug., hdy. per., yel. (*see p.* 329).
mikanioides, Dec., grh. cl., yel. German Ivy.
Petasites, 3′ to 8′, spr., grh. per., yel. (*syns.* platanifolius of gardens and Cineraria Petasites).
pulcher, 1′ to 2′, aut., hdy. per., pur.
pyramidatus, 2′, sum., grh. per., yel.
sagittifolius, 7′ to 10′, sum., grh. per., creamy wh.
Smithii, 3′ to 4′, Je., hdy. per., wh.
speciosus, 1′, Jy., grh. per., pur.

Other Species and Varieties :—

aconitifolius, 4′, sum., hdy. per., pk.
adenotrichia, 2′, My., grh. sub-shr., yel.
adonidifolius, 1′ to 1½′, Jy., hdy. per., or. (*syn.* abrotanifolius).
Anteuphorbium (now Kleinia Anteuphorbium).
aurantiacus (the correct name of Cineraria aurantiaca).
auriculatissimus, Feb., grh. climbing shr., yel.
balbisianus (correct name of Cineraria longifolia of Allioni).
brachychætus (correct name of Cineraria longifolia).
carniolicus, 1′, hdy. per., yel.
Cineraria (correct name of Cineraria maritima).
Claussenii, 2′, aut., grh., yel.
concolor, 1′ to 2′, sum., hlf-hdy. per., purplish wh.
correvonianus, hdy. per., yel.
cruentus (correct name of Cineraria cruenta).
diversifolius pinnatifidus, 2′, Je., hlf-hdy. per., pur. (*syn.* Brachyrhynchos albicaulis).
Doria, 4′, Aug., hdy. per, yel.
elæagnifolius, 6′ to 8′, grh. shr., yel.
Galpini (now Kleinia Galpini).
glastifolius, 4′, Je., grh. sub-shr., pur. (*syn.* lilacinus of *Botanical Register* 1342).
grandiflorus, 4′ to 5′, Aug., grh. per. (*syn.* venustus).
hamburianus, 5″, st., yel
Haworthii, Jy., grh. sub-shr., yel.
Hualtata, 5′, Je., hdy. per, yel.
japonicus (the correct name of Ligularia japonica).

Kæmpferi (correct name of Ligularia Kæmpferi).
— aureo-maculatus, lvs. blotched yel.
— variegatus, variegated.
lagopus, 6″, sum., hdy. per., yel.
laxifolius, Je., grh. shr., yel. (correctly laxifolius of Masters).
Ledebourii (correct name of Ligularia macrophylla).
leucostachys, lvs. elegant, whitish, otherwise like Cineraria.
Ligularia, 2′ to 4′, sum., hdy., yel.
lilacinus, near glastifolius, now considered distinct.
multibracteatus, 1½′, sum., grh. ann., pur.
multiflorus, 3′, sum., hlf-hdy. per. (*syns.* Cineraria multiflora and Doronicum Bourgæi of *Botanical Magazine* 4994).
Palmeri, 1′ to 2′, grh. per. or hdy. ann., yel. plant with wh. felt.
populifolius, 2′, spr., grh., lil. wh., yel.
præcox, 2′, Je., grh. sub-shr., yel.
petroneurus, 4′ to 8′, Nov., grh., pale yel.
scaposus caulescens, 1′, Aug., yel.
spathulæfolius, 6″ to 12″, sum., hdy. per., or. yel.
stenocephalus comosus, 2′, sum., hdy. per., yel.
subscandens, Jan., grh. cl., yel.
uniflorus, 3″, Jy., hdy. per., yel.

SENSITIVE PLANT (*see* MIMOSA PUDICA).

SEQUOIA (*syns.* WELLINGTONIA, WASHINGTONIA of Winsl., etc.).

Description.—Two species of magnificent and gigantic trees (*ord.* Coniferæ). In their native country, California, their dimensions excite universal surprise and admiration. The largest Wellingtonia is the mammoth of trees, and rises to a height of upwards of 300′, with a trunk diameter of 20′ to 30′. The tallest living tree measured was 325′ in height, and was one of the "Three Sisters" of Calveras, but the largest one, overthrown by storms, was estimated at 425′. There is no probability of the Wellingtonia ever attaining in Great Britain more than one-half the size and age of the great Californian giants. It is a noble tree when grown in avenues such as that at Orton Hall, Peterborough, where the trees are between 60′ and 70′ high. It is even nobler when standing alone and retaining its lower branches. Sempervirens, the Redwood, is the most valuable of Californian trees, and is so much in demand for structural and domestic purposes that its destruction as a forest tree is within the limits of a few years. It is a fast growing tree in Great Britain and Ireland, particularly in moist and well-drained soils, and is much admired for its pyramidal form and its deep coloured, Yew-like appearance. The Sequoias are not to be universally recommended for this country.

Propagation.—By seeds, sown in a cold frame in spring, and the seedlings transplanted to the open ground when they can be handled. Also by cuttings under a hand-light in autumn; the variegated forms by grafting.

Soil.—Any common soil, though they thrive best on one moist, but well drained.

Only Species and their Varieties:—

gigantea, 300′, habit spire-like, lower branches drooping, upper ascending, lvs. remaining three to four years, bl., grn. (*syn.* Wellingtonia gigantea). Mammoth Tree.
— argentea, twigs smaller, silvery.
— aurea, twigs smaller, yellowish.
— glauca pyramidalis, more glaucous, pyramidal.
— pendula, drooping, the best var.
— pyramidata compacta, compact, pyramidal growth.

Senecillis (*see Senecio*).
Sensitive Fern (*see Onoclea sensibilis*).
Septas (*of Linn., see Crassula*).

Photo Cassell & Company, Ltd.

SENECIO MACROPHYLLUS (*see p.* 328).

There are other vars., such as pygmæa and variegata.
sempervirens, 180′ to 250′, lower branches drooping, upper ascending, dark grn. (*syns.* gigantea of Endlicher in part and Taxodium sempervirens). Redwood.
— appressa, smaller, branches shorter, stiffer, younger lvs. and tips creamy wh. (*syn.* albospica of gardens).
— glauca, lvs. glaucous bl., branchlets narrower, more slender.
— taxifolia, lvs. broader.

SERAPHYTA.

Multiflora, the only species, 1′ to 2′, April, greenish white, is a stove Orchid (*ord.* Orchidaceæ), with small flowers in loose racemes and broadish leaves. It requires the same cultural treatment as Epidendrum, which *see* (*syns.* diffusa and Epidendrum diffusum).

SERAPIAS (*syn.* HELLEBORINE).

Terrestrial Orchids (*ord.* Orchidaceæ), hardy or requiring frame cultivation. (For cultivation, *see* ORCHIS.)

Principal Species, Variety, and Hybrid :—

cordigera, 1′, sum., lavender, br.
lingua, 1′, Ap., reddish br.
— luteola, My., yel., pur.
papilionaceo-lingua, 1′, sum., pur., grn., hybrid (Orchis papilionacea × S. lingua).
pseudo-cordigera, 1½′, My., pur., grn. (*syns.* longipetala).

SERENOA. (SAW PALMETTO.)

An elegant Palm (*ord.* Palmæ) of dwarf, tufted habit, and suitable for greenhouse cultivation. Propagation, by seeds sown in heat. Soil, light sandy loam.

Only Species :—

serrulata, 4′ to 8′, Je., lvs. fan shaped, circular, fruit black.

SERICOCARPUS. (WHITE-TOPPED ASTER.)

Little cultivated hardy perennial plants (*ord.* Compositæ), closely related to and much resembling Asters in general appearance. Propagation, by division or seeds. Any common soil.

Principal Species :—

conyzoides, 1′ to 2′, Jy., wh.
solidagineus, 2′, Jy., wh.

SERINGIA.

A pretty greenhouse shrub (*ord.* Sterculiaceæ), with flowers in flat heads and coarsely toothed leaves. Propagation, by seeds or by cuttings of young growths under glass. Soil, loam, peat, and sand. Seringia of Spreng. is Ptelidium.

Only Species :—

platyphylla, 10′, Je., wh.

SERISSA.

Greenhouse or half-hardy evergreen shrubs (*ord.* Rubiaceæ). Propagated by cuttings in spring. Soil, loam, peat, and sand.

Only Species and its Varieties :—

fœtida, 2′, sum., wh. (*syn.* Lycium japonicum).
— flore pleno, flowers double.
— aureo-marginata, lvs. margined yel.

Sericographis (*see Jacobinia*).

SERJANIA (*syn.* SERIANIA).

Although this is a large genus (*ord.* Sapindaceæ), few of the species are cultivated, and even they are only to be found occasionally in botanic establishments. The plants have yellow flowers. All of them are of climbing habit, and need a stove temperature. Propagation, by cuttings, in sandy soil, in heat. Soil, loam two parts, leaf mould one part, and sand. Caracasana, cuspidata, and nodosa are at Kew.

SERPICULA (*syn.* LAUREMBERGIA).

A small and unimportant genus of sub-aquatic herbs (*ord.* Haloragеæ), with minute, bundled flowers. Repens, the only species which has been brought to this country, has probably disappeared entirely ; it is no loss.

SERRASTYLIS.

A South American Orchid (*ord.* Orchidaceæ), with a drooping raceme of flowers about 1″ across. It has the habit of Trichopilia, but is allied to Brassia. (For culture, *see* ONCIDIUM.)

Only Species :—

modesta, st., red, yel., lip wh., pur.

SERRATULA. (SAW-WORT.)

Hardy perennial herbs (*ord.* Compositæ) of little value for the garden. Propagation, by seeds or division. Ordinary garden soil. From the British tinctoria a yellow dye has been obtained.

Principal Species and Variety :—

coronata, 5′, Je., pur.
— macrophylla, foliage larger.
heterophylla, 2′, Jy., pur. (*syn.* Kitaibelii).
quinquefolia, 3′, Jy., pur.
tinctoria, 2′, Jy., pur.

SERRURIA.

Greenhouse shrubs (*ord.* Proteaceæ) of considerable beauty. Propagation, by cuttings of ripened shoots in sand under a bell-glass, but not in heat. Guard against the cuttings damping off. Soil, light, fibrous loam with charcoal and pieces of sandstone.

Principal Species :—

abrotanifolia, 3′, Jy., pk. (*syn.* Protea abrotanifolia hirta).
florida, 2′, Jy., pur.
odorata, 2′, Jy., pk. (*syn.* Protea abrotanifolia odorata).
Roxburghii, 3′ to 4′, Jy., wh.

Other Species :—

anethifolia, 7′, Jy., pur. (*syns.* argentiflora and triternata).
arenaria, 1′, Jy., pur.
artemisiæfolia, 7′, Jy., pur. (*syn.* pedunculata),
barbigera, 3′, Jy., pur. (*syns.* phylicoides and Protea abrotanifolia).
crithmifolia, 1½′ to 2′, Jy., pur. (*syn.* elongata).
emarginata, 2′, Jy., pk. (*syn.* abrotanifolia minor).
glaberrima, 1′, Jy., pur.
millefolia, 4′, Jy., pur. (*syn.* Protea triternata).
nitida, 2′, Jy., pur.
Niveni, 9″, Jy., pur. (*syn.* Protea decumbens).
rubricaulis, 2′, Jy., pur.
villosa, 2′, Jy., pur.

SERVICE.

Service Berry is a name commonly given to the fruits of Amelanchier canadensis. The name Service Tree is applied to several species of Pyrus. Thus P. Torminalis is the Wild, and P. Sorbus (*syn.* domestica) the True, Service Tree. (For other particulars, *see* PYRUS.)

A service pipe is a water pipe leading from the main into a house.

Service Berry (*see Amelanchier vulgaris*).
Service Tree (*see Pyrus Sorbus*).

SESAMUM.

Stove herbs (*ord.* Pedalineæ), erect or prostrate in habit, with white or pale violet flowers and very oily seeds. They have little garden value, but indicum, the Gingelly Oil Plant, is extensively cultivated in the tropics for the oil (Gingelly Oil) furnished by its seeds. Culture as for Martynia, which *see*.

Principal Species :—

indicum, 1′ to 2′, Jy., st., wh., with red., pur., or yel. markings (*syns.* luteum and orientale). Gingelly or Gingellie Oil Plant, Sesame, Oily Grain.

SESBANIA. (Including AGATI, DAUBENTONIA, and GLOTTIDIUM.)

A genus of greenhouse or stove shrubs or herbs (*ord.* Leguminosæ). Propagation, by cuttings of half-ripe shoots of the shrubs; the annuals by seeds sown in heat in spring. Soil, loam, peat, and sand.

Principal Species :—

ægyptiaca, 4′, Jy., st. ev. shr., yel. Sesban.
exasperata, 8′ to 10′, Jy., st. ev. shr., yel.
punicea, 3′, Jy., st. shr., sc. (*syn.* Daubentonia punicea).

Other Species :—

aculeata, 4′, Jy., st. ann., yel.
grandiflora, 14′ to 26′, Jy., st., ro. or wh.
longifolia, 6′, Je., st. shr., yel.
macrocarpa, 3′, Aug., grh. ann., yel , red, pur.
occidentalis, 4′ to 6′, Jy., st. bien., yel., blk. (*syn.* picta).
platycarpa, 7′, Jy., grh. ann., yel. (*syns.* vesicaria and Glottidium floridanum).
Tripetii, 6′, Je., grh. shr., sc., yel. (*syn.* Daubentonia Tripetii).

SESELI. (MEADOW SAXIFRAGE.)

A genus of hardy biennial or perennial plants (*ord.* Umbelliferæ), of little garden value. Propagation, by seeds sown in spring. Ordinary garden soil.

Principal Species :—

dichotomum, 1′ to 2′, Je., per., wh.
gummiferum, 3′ to 4′, Jy., bien., wh., pk.

SESIA. (CLEAR-WING.)

A genus of moths with nearly transparent wings. The larvæ live and pupate in the tunnels they bore in the pith and wood of trees. Myopæformis (Red-belted Clear-wing), feeding on Pear wood; tipulæformis (Currant Clear-wing), on Currants; formicæformis (Red-tipped Clear-wing), on Willows; and apiformis (Hornet Clear-wing), on Poplars, are the most injurious. Catching the moths, and burning badly infested trees, are the only remedies.

SESLERIA.

Hardy Grasses (*ord.* Gramineæ), of no horticultural value. Cœrulea, 6″ to 18″, bluish, is a native species.

SESUVIUM.

Stove or greenhouse, seaside, succulent herbs or sub-shrubs (*ord.* Ficoideæ). Few require mention for garden purposes, but two have been used as potherbs. Propagation, by cuttings in sand, after being laid in the sun for a few hours to dry. Sandy, dry soil.

Principal Species :—

Portulacastrum, Jy., prostrate, grh., reddish (*syn.* Aizoon canariense). Sea Purslane, Samphire of West Indies.
revolutifolium, Jy., prostrate, grh., red, wh. (*syn.* Portulacastrum var. of *Botanical Magazine* 1701).

SETARIA.

A large genus of stove, greenhouse, or hardy annual Grasses (*ord.* Gramineæ), with flat leaves and panicles of ovate spikelets. Propagation, by seeds, the stove and greenhouse ones sown in heat under glass, the others in the open.

Principal Species :—

glauca, 1′, hdy. ann.
italica (*syn.* Panicum italicum of Linnæus).
verticillata, hdy., naturalised in fields.
viridis, 1′, hdy. Bottle Grass, Great Foxtail Grass.

SETS.

The term applied principally to the tubers of Potatoes, Dahlias, and such-like plants when about to be planted, but mostly to "seed" Potatoes.

SETTING.

The pollination of the female blossom by the application of pollen from the male one. In some cases this is easily performed with plants under glass by tapping the stems slightly so as to cause the pollen to be dispersed; but in others it is necessary to brush the flowers lightly over with some soft material, such as a hare's or rabbit's tail. It will be found that some varieties of the plants which require setting, such as Melons, Grapes, and Tomatoes, are more difficult to fertilise than others. They are what are called "shy setters."

SEVERINIA.

A useful evergreen, greenhouse shrub (*ord.* Rutaceæ), requiring ordinary greenhouse cultivation in loam, leaf soil, and a little sand.

Only Species :—

buxifolia, 3′, My., wh. (now Atalantia buxifolia).

SEYMERIA (*syn.* AFZELIA of Gmelin).

Erect annual or perennial herbs (*ord.* Scrophularineæ), generally hardy. Those named are rather pretty plants for the garden. Propagated like other hardy annuals, which *see*. Light, rich soil.

Principal Species :—

pectinata, 1′, Jy., yel.
tenuifolia, 2′ to 4′, Jy., yel.

SHADES.

Shades, or protections from sun, are of great importance in growing plants under glass, in protecting seedlings and newly planted things outdoors, and in shielding flowers intended for exhibition. For plants under glass there is nothing so good as a movable shade, composed of some light material, and fixed to rollers so that it can be drawn up at will. Various kinds of this, almost all good, can be procured from dealers in horticultural requisites. Lath or Bamboo blinds fixed on rollers are also used by some. While a blind of some kind of textile material is the best, fixed shades painted or brushed on the glass are in greater use, and are very serviceable. Many good preparations are in use, such as the well-known "Summer Cloud" in two colours, green or grey, which should be applied outside the glass. A good shading, which can be mixed in cold water, is Williams's "Eureka," but there are many other good makes. A cheap one is made of

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Setterwort (*Helleborus fœtidus*).
Set Wall (*see Valeriana*).
Seville Orange (*see Citrus and Orange*).
Sewerzowia (*see Astragalus*).
Seymouria (*see Pelargonium*).
Shaddock (*see Citrus decumana*).

whiting or flour mixed with milk, and applied with a brush on the outside, adding a little green colour if the white is objected to. Similar shading can be applied to frames and hand-lights. In applying it, a neater appearance is given by stippling than by painting it on in the ordinary way. Shades for seedlings and plants newly transplanted are very beneficial, and even a tilted flower pot put over a plant may prove its salvation in a day of strong sunshine. Shades for plants in bloom are often made of scrim or some other light fabric, and single flowers are shaded by various contrivances, such as pieces of pasteboard, tin, or wood, or a flower pot placed over.

SHALLOT.

The Shallot (Allium ascalonicum, *ord.* Liliaceæ) has long been in favour for flavouring purposes, and for pickling. The clumps of bulbs should be divided up, and the "cloves" or divisions planted separately. Propagation by seed is sometimes attempted. It is frequently stated that Shallots should be planted on the shortest and the crop pulled up on the longest day. In very few localities, however, is such early planting practicable. Still, the cloves should be got in as early as possible—for most soils, and in ordinary seasons, the end of January or the beginning of February is the most convenient time. July is the usual month for harvesting. Soil as for Onions, which *see*.

The rows may be 1′ apart, and the cloves may be 6″ asunder in the row. For large specimens intended for exhibition, 9″ is frequently allowed. Only bury the bulbs deeply enough to keep them in their allotted places—the crowns should appear well above the soil.

Subsequent culture consists in keeping the soil stirred and the beds free from weeds, with, perhaps, an occasional watering if June should be dry. As thorough ripening is important, a little of the soil may be drawn away from the sides of the bulbs as they approach maturity. When the foliage has died down, spread the bulbs thinly on a mat in an open shed to dry thoroughly.

The ordinary variety has rather elongated bulbs, which keep well, and seldom "bolt." Russian or Large Red has much bigger bulbs, reddish brown in colour. Jersey has rounder bulbs than the common variety, but is not so good a keeper.

SHAMROCK.

It is a moot point as to which plant it was whose leaves St. Patrick used to illustrate the doctrine of the Trinity. Quite a number of subjects have had this honour laid to their credit, but it is still undecided which of them is the real Shamrock of Ireland. Opinion is fairly evenly divided between the Yellow-flowered Suckling, Trifolium minus, and the white Dutch Clover, Trifolium repens. The Shamrock sold in the streets is almost always represented by one of these plants. The third claimant, Oxalis acetosella, also a British wilding, lags a good deal in the rear. It is a prettier plant than either of the Trefoils mentioned, and is usually to be found growing in semi-shade. It likes a light, rich soil; leaf mould is an excellent dressing. It will do in a shaded corner of the rockery. (For other particulars, *see* Oxalis and Trifolium.)

Shallon (*see Gaultheria Shallon*).

SHANKING.

The premature drying up of the stems and footstalks of plants and fruits. The shanking of Grapes is a well-known, troublesome malady. The berries apparently progress satisfactorily up to a certain point; then, just as ripening is beginning, the footstalk shrivels, and the berry, deprived of a good deal of its nourishment, remains very sour and watery, and turns of a red hue. Sometimes shanking appears at the stoning period, and it has been known to show when the berries are quite small. Shanking in Vines may be brought about in two or three ways. Bad ventilation of the houses, with extremes of heat and cold, and cold draughts, is frequently to blame. When the roots get into a cold, wet subsoil shanking commonly ensues. The remedy is to lift the roots and replant them at a higher level. The exhaustion of the soil or some of its necessary ingredients, especially lime, will bring about shanking. Over-rich soil is yet another cause of shanking, and the pernicious practice of surfeiting Vine borders with gross organic manures has been largely to blame in this connection. A too strong dose of chemical manure, particularly a nitrogenous one, sufficient to "burn" the roots (*see* Salts) is now and again to blame. Shanked berries should be cut out as soon as they are seen, as they are of no use.

The shanking of the main stems of young Lettuces and Cauliflowers in pans or frames is mainly due to crowding. In the case of early Cauliflowers raised under glass overwatering will probably be found to be the cause. Where out of door crops are concerned, the cause may be the heritage of the crowding under glass — even partially shanked plants should never be planted —or the direct causes of soil exhaustion and overcrowding may operate.

SHEARS.

These are really big scissors, whose power is increased proportionately to their size. The ordinary hand shears used for cutting hedges and topiary work generally have blades about 12″ long and 3″ wide, with handles describing with them an angle of about 170°. These shears are usually held, in use, so that the cutting edges work horizontally. The useful grass-edging shears, on the other hand, are used so that the cutting edges work vertically, or nearly so. The nearer they are to the vertical the better, because the straighter and more vertical will be the grass edge. The handles are about 3′ 6″ in length. Small sheep shears, whose blades are kept in contact by a flat, half-hoop spring, are exceedingly useful garden tools, and can at a pinch be made to do the same work as the makes previously noted. Moreover, they are cheap and handy for the suburban villa-holder, seeing that they take up little room. It is not a great hardship to edge a small town garden lawn with them. Like all other cutting instruments, shears should be kept clean and free from rust if they are to be efficient. A greasy rag should be rubbed over the blades after use.

Sharewort (*Aster Tripolium*).
Sharp Cedar (*Acacia Oxycedrus and Juniperus Oxycedrus*).
Sheep Laurel (*see Kalmia angustifolia*).
Sheep's Scabious (*see Jasione*).
Shek-in (*Primulina Tabacum*).

SHELTER.

When choosing the site for a kitchen or fruit garden, it is necessary to have an eye to the situation of the plot with regard to shelter. Hills, hedges, woods, and even buildings may all play an important part in this matter (*see* KITCHEN GARDEN and FRUIT GARDEN). Where, however, shelter does not already exist it must be provided. An excellent method of breaking the force of the wind is to plant at intervals clumps or rows of quick-growing trees, such as Lombardy Poplars. A hedge of Beech, Holly, Privet, or Hornbeam may be pressed into service, planting these so that they describe a series of squares. This is a favourite plan with nurserymen. For seaside places there is no better hedge plant than the Tamarisk, and it has the additional merit of being an elegant one, while it does not mind the salt spray.

For temporary shelters a number of contrivances are available. Covering with mats, tiffany, and Frigi-domo come well under this head, as does also the protection of tender subjects, or plants which may be in flower, by means of bell-glasses, hand-lights, and frames.

Boughs of Spruce Fir, Laurel, and other evergreens make excellent winter covering for Magnolias and other tender wall trees. The exclusion of light for a protracted period is harmful. For covering dwarf Roses, Bracken is best, as straw and hay are untidy. Covering the roots of plants in autumn with a mulching of yard dung is another method of giving them shelter. Or the clumps may be covered by a thick layer of leaves, as in the case of the Gunneras.

A shelter ground or protection ground—*i.e.* a framework of wood boarded up to 3′ or 4′ from the ground, but open at the top—is almost indispensable in every garden. It is of the greatest value in sheltering bedding plants that are being hardened off. During the winter also it will accommodate the Deutzias, Roses, Spiræas, and other material waiting to be forced. The usual plan of covering the roof is by tarpaulins, which may be rolled upon wooden rollers.

Roses intended for exhibition must be sheltered from the sun, or much of the colour will be bleached out. Various contrivances are extant, but one of the best is a little adjustable hood. Gladioli are sheltered by little wooden boxes with glass fronts, and open at the bottom. Wall fruit trees may be protected when in flower by a thin covering of tiffany or fish netting.

SHEPHERDIA.

Three species only (*ord.* Eleagnaceæ) of hardy, ornamental shrubs. Culture as for Hippophae.

Principal Species :—

argentea, Ap., yel., berries sc., acid, edible (*syns.* Hippophae and Leptargyreia argentea). Beef Suet Tree, Rabbit Berry.

canadensis, 3′ to 6′, My., yel., covered rusty scales, berries yel., red, not of agreeable flavour (*syns.* Hippophae and Leptargyreia canadensis).

SHEPHERD'S PURSE.

A troublesome little Cruciferous weed (Capsella Bursa-pastoris), remarkable both for its vitality and the quantity of seed that it produces. Hand-picking and the frequent use of the Dutch hoe are the remedies.

She Oak (*Casuarina stricta*).
Shepherd's Beard (*see Urospermum*).
Shepherd's Clock (*Tragopogon pratensis*).
Shepherd's Club (*see Verbascum Thapsus*).
Shepherd's Knot (*see Potentilla*).

SHERBOURNIA.

The only species (*ord.* Rubiaceæ) was formerly included with the Gardenias, and may be treated like them.

Only Species :—

foliosa, sum., st. ev. shr., wh., pur., or. (*syns.* Amaralia bignoniæflora, and Gardenia calycina and Sherbourniæ).

SHIFTING.

Shifting is often synonymous with potting. Particulars will be found under POTTING.

The term "shifting" is often applied to the lifting and removal to another place of various plants growing in the open ground. In the case of fruit trees, involving, as it does, severance of some of the stronger roots, this removal tends to the development of fruitful habits. Where mixed shrubberies are a feature of the grounds and flower gardens, and it is desired to have an immediate effect, the shrubs are always put in rather closely. So much is this so that it is very necessary to go over these shrubberies subsequently and shift a number of the plants to other quarters. The permanent tree features of the grounds should be so arranged that no subsequent shifting is needed, or much labour and expense may be involved.

The shifting of plants from the supply department to the show houses is always an important item in big gardens. For plants in flower the hand-barrow is the best means of conveyance; wheelbarrows and horse-drawn vehicles jolt too much. For long journeys the plants should be packed tightly into the cart, and the horse only allowed to proceed at walking pace. Foliage plants and Ferns are not so particular. In winter there is the added difficulty of exposure to the cold. When frosts and cold winds prevail, the hand-barrow and cart must be covered.

It is an excellent plan to shift the plants about occasionally in the conservatory. New combinations may thus be made, and added interest given.

SHIRLEY POPPIES (*see* PAPAVER).

SHORTIA.

A genus of charming perennial herbs (*ord.* Diapensiaceæ), with exquisitely beautiful flowers and pretty radical leaves, which render them among the most prized occupants of an Alpine garden. Two of the three known species are in cultivation. Propagation, by division, which should only be adopted with good-sized plants, or by offsets, removed in spring or after flowering. For soil, peat and sand are suitable, in a partially shaded position, with plenty of water in summer. Shortia californica is properly Actinolepis coronaria.

Principal Species :—

galacifolia, 3″ to 9″, spr., wh. (*see p.* 334).

uniflora, 2″ to 6″, spr., pale pk.

SHOT BORERS.

Mischievous little dark brown or black beetles, popularly known as the Apple-bark Beetle (Xyleborus or Bostrichus dispar), which attack Apple,

Shield Fern (*see Aspidium*).
Shingle Oak (*Quercus imbricaria*).
Shingle Plant (*Monstera acuminata*).

Pear, and Plum trees, amongst others. The female beetles are about $\frac{1}{8}''$ in length; the males are much smaller. They are on the wing towards the end of spring. The pests bore numerous little galleries in the bark and wood, and do incalculable damage. These galleries are lined with "ambrosia," a white substance which supports fungoid growth. The beetles feed upon the ambrosia. The remedy is a thick wash of soft soap and washing soda, applied in the mornings of warm days. This dries on, stops up the galleries, and suffocates the pests.

SHREDS.

Nailing is not practised nowadays for wall trees very much; wires and ties have been found to be an improvement. The shreds used in nailing are generally obtained from the waste cuttings of cloth, and should be prepared in wet weather. Although shreds have the advantage over ties that they never cut or chafe the bark of tender shoots, they unfortunately harbour a good many insects. Where insect pests are troublesome it is advisable to remove all the old shreds each year, burn them, and re-nail the trees entirely.

SHRIVELLING.

The shrivelling of the skin of Apples, Pears, Plums, Grapes, and other fruits before they have attained to ripeness bespeaks an inadequate supply of nutriment to the fruit, which may be brought about in several ways. It may be due to shanking, which *see*. Frequently it is due to the lack of moisture in the soil. Trees carrying heavy crops of fruit are given no more consideration than those with light crops, and the result is disastrous. Copious supplies of liquid to the roots are good. Thinning heavy crops is also advisable.

Pears that have been gathered too soon shrivel; so do Plums that have been left for a long time upon the tree, but in the latter case the flavour is not impaired—it is rather improved—unless the fruit approach the dead-ripe stage. Late kept Grapes will shrivel, but this is different from shanking, and the flavour is not affected until fermentation sets in.

When resting various bulbous and pseudo-bulbous plants only give enough water to prevent shrivelling to any great extent. The same rule applies to Cactaceous and other succulent plants in winter. Old bedding "Geraniums" (Zonal Pelargoniums) should be treated in the same way. If kept damp they rot.

SHRUBBERY.

The shrubbery, that portion of the grounds set aside principally or entirely for the cultivation of shrubs, is, or ought to be, one of the most attractive features of a garden. That it is not so is due mainly to errors in planting and management, or to the bad selection of shrubs which has been made. There is no excuse for the monotony and dulness of many shrubberies, as there are many pretty shrubs yielding flowers or pleasing foliage throughout the year.

SHORTIA GALACIFOLIA (*see p.* 333).

In order to make the shrubbery a source of pleasure there should be a due proportion of plants of both evergreen and deciduous habit. In many places the deciduous shrubs are too few in proportion, as, though leafless in winter, the beauty of their young foliage, and frequently that of the dying leaves, is most delightful, apart from the charms of the flowers yielded by so many. The various coloured twigs of several are also attractive in winter. Flowering shrubs ought to be plentifully planted, and there should also be a considerable number with pretty foliage, either of graceful form or habit, or marked with variegation, which often help to brighten up the shrubbery at a dull season. The Hollies and Aucubas are among the best of variegated

leaved shrubs, although all require judgment in planting. The Aucuba is the best large-growing shrub for planting under trees. It will thrive where nothing else will.

The question of planting is one which ought to be well considered. The soil should be trenched or bastard trenched, and it ought to consist largely of good loam, with leaf soil or peat as required for the bulk of the shrubs. It should be allowed to settle before planting. The best time for this operation is about October in the case of the deciduous shrubs, but evergreens may be planted with safety in most districts from August to October, and from April to June. The best months are largely to be learned from experience in one's own district, but in places where drying winds prevail in late spring, autumn planting is by far the best for most subjects.

The question of arrangement is a troublesome one, in order to avoid the mistake of stiffness without falling into the fault of absolute want of pleasing effect caused by a disorderly mass. A Shrubbery should in general have the tallest subjects at the back, and ought to form a gradual slope towards the front, broken, however, by a few light shrubs at irregular intervals, or even by standards introduced here and there.

In placing the shrubs in their stations it may be said that a monotonous arrangement, consisting of a frequent repetition of the same species at a regular distance from each other, should as a rule be avoided, and planting in groups generally produces a better effect than that given by single specimens here and there.

Unless the owner can afford to wait until the shrubs attain a good size, it is better to plant more than there will be space for, afterwards removing the surplus. Where the owner is unwilling or unable to be at the expense of this, the vacant spaces between the permanent shrubs may be sown with annuals or planted with some of the cheaper and more robust herbaceous plants. All shrubs which might be disturbed by high winds—and this includes all but a few dwarf ones—ought to be firmly staked and properly fastened to the stakes so that they cannot move, and also in such a way that the bark will not become chafed by friction with the ties. Shrubberies ought not to be beneath the drip of trees. The eventual height and width of the plants must be taken into consideration.

The pruning of shrubs is essential, and the directions under PRUNING (which *see*) will give an idea of the best course to follow.

SHRUBS.

A shrub may be defined as a low plant with a woody stem, but this definition is hardly broad enough, inasmuch as climbers with such stems are generally included with shrubs. According to some authorities a plant is not a shrub unless it is less than 12′ or 15′ in height, except it is a climber. In practice the term "shrub" is, however, loosely applied, and sub-shrubs are often included with them in gardening language.

They are very numerous, and include genera and species which require stove or greenhouse treatment, as well as those which are hardy or half-hardy. It is more convenient, however, only to name in the following lists those which are generally hardy throughout the three kingdoms, and which can thus be used in the formation of a shrubbery. The following lists name only some of the most useful genera, and details of the species will be found under the respective titles.

Shrubby Pink (Dianthus fruticosus).

Selection of Leading Genera :—

Deciduous :—

Abelia.
Acer.
Actinidia.
Æsculus.
Amelanchier.
Amorpha.
Ampelopsis.
Aralia.
Aristolochia.
Artemisia.
Atragene (Clematis).
Azalea.
Berberis.
Bignonia.
Buddleia.
Calophaca.
Calycanthus.
Caragana.
Ceanothus.
Celastrus.
Cerasus (*see* Prunus).
Cercis.
Chimonanthus.
Chionanthus.
Clematis.
Clethra.
Colutea.
Cornus.
Corylopsis.
Corylus.
Cotoneaster.
Crataegus.
Cydonia (*see* Pyrus).
Cytisus.
Daphne.
Deutzia.
Diervilla.
Enkianthus.
Euonymus.
Forsythia.
Fothergilla.
Genista.
Gordonia.
Halesia.
Halimodendron.
Hamamelis.
Hibiscus.
Hippophae.
Hydrangea.
Hypericum.
Indigofera.
Jasminum.
Kerria.
Laburnum.
Leycesteria.
Ligustrum.
Lonicera.
Magnolia.
Neillia.
Nuttallia.
Parrotia.
Pavia (*see* Æsculus).
Periploca.
Philadelphus.
Potentilla.
Prunus.
Pyrus.
Rhamnus.
Rhododendron.
Rhus.
Ribes.
Robinia.
Rosa.
Rubus.
Salix.
Sambucus.
Spartium.
Spiræa.
Stuartia.
Styrax.
Syringa.
Tamarix.
Tecoma.
Ulex.
Vaccinium.
Viburnum.
Vitis.
Weigela (*see* Diervilla).
Wistaria.
Zenobia.

Evergreen :—

Andromeda.
Arbutus.
Arundinaria.
Aucuba.
Azalea.
Azara.
Bambusa.
Berberidopsis.
Berberis.
Bryanthus.
Buxus (Box)
Calluna.
Cassandra.
Cassinia.
Cassiope.
Ceanothus.
Cerasus (*see* Prunus).
Cistus.
Clematis.
Coronilla.
Cotoneaster.
Crataegus.
Cytisus.
Cupressus.
Daboëcia.
Daphne.
Elæagnus.
Empetrum.
Erica.
Euonymus.
Garrya.
Gaultheria.
Genista.
Hedera.
Helianthemum.
Iberis.
Ilex.
Jasminum.
Juniperus.
Kalmia.
Lavandula.
Ledum.
Leiophyllum.
Leucothoë.
Ligustrum.
Lonicera.
Lupinus.
Magnolia.
Margyricarpus.
Myrica.
Olearia.
Osmanthus.
Pernettya.
Phillyrea.
Phyllostachys.
Pieris.
Quercus.
Rhododendron.
Rhodothamnus
Rosmarinus.
Smilax.
Taxus.
Thuya.
Thymus.
Veronica.
Viburnum Tinus.
Yucca.

For Seaside :—

Atriplex Halimus.
Baccharis halimifolia.
Berberis, in variety.
Ceanothus americanus.
Cistus ladaniferus.
Clematis Flammula.
Coronilla Emerus.
Cotoneaster.
Crataegus.
Cupressus lawsoniana.
Cytisus scoparius.
Elæagnus.
Ephedra.
Escallonia.
Euonymus japonicus and europæus.
Halimodendron argenteum.
Hedera Helix.
Hippophae rhamnoides.
Ilex Aquifolium.
Juniperus communis.
Laburnum.
Leycesteria formosa.
Lonicera.
Lycium.
Olearia.

Pinus montana var. Mughus.
Prunus lusitanica.
Prunus Padus.
Pyrus.
Rhamnus.
Rhododendron catawbiense.
Rosa rugosa.
Salix, in variety.
Shepherdia argentea.
Symphoricarpus.
Syringa.
Tamarix.
Ulex europæus.
Veronica.
Viburnum Tinus.
Yucca.

These do with little shelter. Many others can be grown with protection from wind.

For Town Planting :—

Amelanchier.
Arbutus Unedo.
Berberis Aquifolium.
Berberis vulgaris.
Colutea arborescens.
Daphne Laureola.
Daphne Mezereum.
Deutzia crenata.
Diervilla.
Forsythia.
Hedera.
Hypericum calycinum.
Kerria japonica.
Kolreuteria.
Leycesteria formosa.
Philadelphus.
Phillyræa.
Pyrus japonica.
Potentilla fruticosa.
Rhus Cotinus.
Ribes aureum.
Ribes sanguineum.
Skimmia.
Syringa.
Viburnum.
Yucca.

SHY BUG.

A member of the Hemiptera (Anthocoris Nemorum), which is both a friend and an enemy to the gardener. It sucks the juices from the leaves and stems of Hops, but in return it destroys vast numbers of Aphides. The insects are very small, dark red, with yellow wing cases margined red. The larvæ are rather lighter in colour. There are two or three broods during the year. The insects secrete themselves if man approaches.

SIBTHORPIA (*syn.* DISANDRA).

Greenhouse and hardy trailing herbs (*ord.* Scrophularineæ). Europæa, the Cornish Moneywort, Pennyleaf, or Pennywort, and its golden variety only are cultivated. These pretty little trailers do best in a greenhouse during the winter months, and at all times of the year they thrive amazingly in an ordinary dwelling room window. They make good basket plants, more especially the two varieties, and take kindly to pots or to wooden or wire baskets, needing very little attention. Pots of Sibthorpias are excellent for putting a finish to the stages in cool Orchid houses during the summer, but they must be lifted from the stage and suspended from the roof through the winter, or a great part of the growth will damp off. Propagation, in sandy soil in a cold frame, by cuttings, which will root at almost any time of the year, save the depth of winter; also by root division. Soil, equal parts of loam and leaf soil, with sand. Give plenty of water all through the summer.

Principal Species and Variety :—

aurea, golden grn.
europæa, 6″ to 12″, Jy., hdy. per. herb, pk. Cornish Moneywort.
— variegata, grh., lvs. variegated.

Other Species :—

peregrina, Je., hdy., grh., yel. (*syn.* Disandra prostrata of *Botanical Magazine* 218).

SICANA.

Tender climbing herbs (*ord.* Cucurbitaceæ), with large, solitary, usually yellow, flowers, and with huge, fleshy fruits. (For cultural details, *see* GOURDS.)

Only Species :—

atropurpurea, reddish vio., fruits pur. vio., strongly scented.
odorifera, yel., fruits yel. or or., scented, edible, lvs. 10″ across.
sphærica, Sep., yel., fruits like small Oranges, yel.

SIDA. (INDIAN MALLOW.)

Stove, greenhouse, or hardy shrubs, sub-shrubs, or herbs (*ord.* Malvaceæ), of which but few are in general cultivation. These are generally effective plants, with flowers of good colours. Propagation, by seeds sown in heat, or by cuttings in sand in a greenhouse or stove, under a bell-glass. Any good soil. (*See also* ABUTILON.)

Principal Species :—

alcæoides (now Callirhoë alcæoides).
inæqualis, 7′, My., st. shr., wh. (according to Kew authorities now under Abutilon).
Napæa, 4′ to 10′, sum., hdy. per. (now Napæa dioica).
periptera (now Anoda punicea).
sessiliflora, 3′, Aug., st. sub-shr., yel. (according to Kew authorities Abutilon crispum).

SIDALCEA.

Hardy perennial herbs (*ord.* Malvaceæ), much resembling some of the Malvas, and of considerable beauty for the herbaceous border. They bloom well in either sun or partial shade. Propagation, by seeds or division, both in spring. Common garden soil.

Principal Species and Varieties :—

campestris, 2′ to 3′, sum., pk. (Sida malvæflora of *Botanical Register* 1036).
candida, 1½′ to 3′, sum., wh.
malvæflora, 1½′ to 3′, sum., lil. (*syns.* oregana, Sida malvæflora, of Hooker and Arnott, and Callirhoë spicata).
— atropurpurea, deep pur.
— James Dickson, dark ro.
— Listeri, pk., fringed, fine var.

SIDERITIS (*syns.* BURGSDORFIA, HESIODIA, and MARRUBIASTRUM. IRONWORT).

Hardy and half-hardy herbs and shrubs (*ord.* Labiatæ). None of the species is of any decorative value, and they only find a place in botanic gardens.

SIDEROXYLON (*syn.* ROBERTSIA).

A genus of upwards of ninety species of stove or greenhouse trees or shrubs (*ord.* Sapotaceæ). The wood of many is of great hardness. The berries of dulcificum are sweet, and known in tropical Africa under the name of the Miraculous Berry. Inerme, a South African species, is known as the Milk Wood. These and two others—Mastichodendron and tomentosum—are grown at Kew. The genus is practically of no value for the garden.

SIEGESBECKIA.

Half-hardy herbs (*ord.* Compositæ), usually annual in this country. Propagation, by seeds, in heat, under glass, in spring (*see* HALF-HARDY ANNUALS). Soil, light and rich.

Principal Species :—

orientalis, 2′, Aug., hlf-hdy., yel. (*syn.* droseroides).

Sibbaldia (*see Potentilla*).
Siberian Crab (*see Pyrus baccata*).
Siberian Pea tree (*see Caragana*).

Sideranthus (*see Haplopappus*).
Siderodendrum (*see Ixora*).
Side-saddle Plant (*see Sarracenia*).

SIEVEKINGIA.

Of the four species of this obscure genus of Orchids (*ord.* Orchidaceæ). one only, reichenbachiana, yellow and red, has been introucded, and even it is not in general cultivation. Culture as for Acineta.

SIEVES.

Several sizes of mesh are needed. Thus $\frac{1}{8}''$, $\frac{1}{4}''$, $\frac{1}{2}'$, $\frac{3}{4}''$, and 1″ meshes would make up a complete set. The mesh is of tough, closely interwoven wire; the surrounding band of wood. Sieves are too often employed for sifting potting soil. Fine soil is needed for sowing small seeds, but ordinary plants require soil chopped up with the spade, or pulled to pieces by hand, all the fibre being retained. The $\frac{3}{4}''$ size is handy for sifting cinders, and it will be much more easy to work it if it be mounted upon a stout **Y**-shaped handle For screening coal and gravel, screens are used in which the bars only run one way; there is, strictly speaking, no mesh. Specially made sieves of various sizes are employed by seedsmen for cleaning various seeds.

SIGMATOSTALIX.

A small and obscure genus of dwarf, stove Orchids (*ord.* Orchidaceæ) They answer to the same attentions as the warmth-loving Oncidiums.

Principal Species :—

malleifera, yel., spotted br.
radicans, yellowish grn., vio. pur.

SILENE. (Catchfly.)

An extensive genus of hardy or greenhouse biennial or perennial herbs (*ord.* Caryophylleæ). A considerable number are valuable for garden decoration in beds or borders, and among the Alpines are some capital rockwork plants. Pendula and its forms are desirable annuals for spring or summer. They are generally of easy cultivation, and of effective colours. Many of the species have a viscid sap on the stems, which gives rise to the popular name of Catchfly, from the insects which are trapped by it. Propagation, the annuals and biennials by seeds, sown in spring under glass or in the open in summer; the perennials by division in spring or in autumn. Sow pendula in August for spring bloom. Soil, light and loamy, with some sand and grit for the Alpines.

Principal Species and Varieties :—

[Note — Hardy perennials unless otherwise marked.]

acaulis, 2″, Je., pk. Cushion Pink, Moss Campion.
— alba, wh.
— exscapa, pale pk., dwarfer.
— grandiflora, crim.
alpestris, 6″, My., wh. (now rupestris of Williams).
Elizabethæ, 9″, Jy., ro.
maritima fl. pl., Je., trailer, wh., double; rockery plant.
pendula, 4″ to 6″, spr., sum., hdy. ann., pk.; good vars. are alba, wh.; compacta, various, single and double; compacta Bonnettii, lvs. and stems pur.; and compacta Empress of India, crim., lvs. and stems pur.; the last is very effective in beds.
pennsylvanica, 4″ to 8″, Ap., pk. American Wild Pink.
rupestris, 6″, My., wh. (*syn.* alpestris of Willdenow).
Schafta, 6″, sum., pur.; valuable for rockeries or edgings.
virginica, 1′ to 2′, Je., crim. Fire Pink.

Sieversia (*see Geum*).
Silenopsis (*see Lychnis*).

Other Species and Varieties :—

ægyptiaca, 6″ to 12″, Je., hdy. ann., pk. (*syn.* Atocion).
Armeria, 1′ to 1½′, Jy., hdy. ann., pk. Sweet William Catchfly.
— alba, wh.
chloræfolia, 1′ to 2′, Aug., wh.
ciliata, 9″, Je., per., wh.; var. Græfferi.
colorata, 1′, Je., ann., ro. (*syn.* vespertina of *Botanical Magazine* 677).
compacta, 1½′, Jy., bien., pk.
cretica, 9″, Jy., bien., grn., wh.
Cucubalus, 2′ to 3′, Je., wh. (*syn.* inflata). Bladder Campion, Cow Ball.
fimbriata, 2′ to 4′, My., wh.
Fortunei, 1′, sum., pk. or wh.
gallica, 1′ to 2′, Je., ann., pk. or wh.
— anglica, wh. (*syn.* anglica).
Hookeri, My., trailing per., pale pk.
italica, 1½′, My., bien., wh.
juncea, 1′ to 2′, Je., ann., pk. (*syn.* picta).
laciniata, 3′, Je., hlf-hdy. per., crim.
maritima, Je., trailer, wh.
— rosea, ro.
noctiflora, 1′, Jy., ann., ro., yel., fragrant.
nutans, 2′ to 3′, Je., wh. (*syn.* paradoxa of Lapeyrouse).
ornata, 2′, My., grh. bien., pur.
paradoxa, 1′, Jy., pk.
Pumilio, 1″, Je., pk.
— alba, wh.
quadrifida, 6″, My., wh.
regia, 3′ to 4′, Jy., sc.
Saponaria (*see* Saponaria officinalis).
Saxifraga, 3″ to 6″, Je., yel. (*syn.* petræa of Waldst. and Kit.)
sericea, 9″, Jy., ann., pk.
stylosa, 6″, Jy., yel.
supina, Je., wh.
tatarica, 2′, Jy., wh.
tenuis, 1′, Je., pur. (*syn.* tenuifolia).
vallesia, 6″, Jy., pale pk.
Zawadskii, 6″, My., wh.

SILPHA.

A genus of beetles sometimes destructive of Beetroots. The larvæ feed on carrion. Dressing affected plants with soot or lime when damp, and using manure free from offal, are the best remedies.

SILPHIUM. (Compass Plant, Resin Plant.)

Coarse-growing hardy perennial plants (*ord.* Compositæ). They produce a resinous juice, but are best known because of the reputed property of one of the species (laciniatum) of turning its leaves always north and south. Propagation, by division or seeds Common soil.

Principal Species :—

laciniatum, 3′ to 7′, Jy., yel. Compass Plant, Pilot Plant, Polar Weed.
perfoliatum, 4′ to 9′, Jy., yel.
— connatum, yel.

Other Species :—

albiflorum, 2′ to 4′, Sep., yel.
Asteriscus, 2′ to 4′, Je., yel.
integrifolium, 4′ to 6′, Jy., yel.
terebinthinaceum, 4′ to 10′, Jy., yel. Prairie Dock.
trifoliatum, 4′ to 6′, Aug., yel.

Silk Cotton Tree (*see Bombax and Eriodendron*).
Silken Sissy (*see Asclepias*).
Silk Tree (*see Albizzia Julibrissin*).
Silk Vine (*see Periploca græca*).
Silky Oak (*see Grevillea robusta*).
Silver Bell Tree (*see Halesia*).
Silver Berry (*see Elæagnus argentea*).
Silver Bracts (*Cotyledon Pachyphyta*).
Silver Bush (*see Anthyllis Barba-Jovis*).
Silver Cedar (*see Juniperus virginiana glauca*).
Silver Fir (*see Abies pectinata*).
Silver Leaf of Peach (*see Peach Diseases*).
Silver Rod (*see Asphodelus ramosus*).
Silver Tree (*see Leucadendron argenteum and Elæagnus*).
Silver Weed (*Potentilla Anserina*).

SILYBUM.

Hardy perennial, spiny herbs (*ord.* Compositæ), Thistle-like in character. Propagation, by seeds, in autumn or spring. The plants are frequently found in waste ground from self sown seed. Any soil will do, but plenty of moisture is required. At one time the roots were boiled as a substitute for Artichokes, and the young leaves picked for salads. Marianum makes a handsome border subject.

Principal Species :—

marianum, 1′ to 5′, sum.. hdy., lvs. rosy pur., spotted wh. Blessed, Holy, and Our Lady's Milk Thistle.

SIMABA (*syn.* ZWINGERA).

Stove and greenhouse evergreen or deciduous trees and shrubs (*ord.* Simarubeæ). Propagation, by cuttings of matured shoots, in sandy soil, in heat; also by imported seeds. Soil, turfy loam three parts, leaf mould one part, and sand.

Principal Species :—

Cedron, 20 , My. sum , fruits as large as a swan's egg.

SIMARUBA. (BITTER WOOD.)

Evergreen stove trees of economic importance. The drug known as Simaruba bark is furnished by amara. (For culture *see* QUASSIA.)

Principal Species :—

amara, 10′, My., st., yellowish wh. Bitter or Mountain Damson, Stavewood. Tulæ, st., car.

SIMETHIS (*syns* MORGAGNIA and POGONELLA)

The only species, bicolor (*syn* planifolia), June, white and purple, is a hardy perennial herb (*ord.* Liliaceæ). It is of little decorative value, though interesting Propagation, by division. Soil, peat and sand.

SIMMONDSIA (*syn.* BROCCHIA).

The only species, californica, green (*ord.* Euphorbiaceæ), is a hardy, branching shrub, propagated by cuttings, and thriving in good loam three parts and sandy peat one part. It is of little value.

SINGANA.

An obscure genus (*ord* Leguminosæ) of no garden value. One species only, guianensis, is enumerated by *Index Kewensis*.

SINNINGIA.

Dwarf, hairy, stove herbs (*ord.* Gesneraceæ), with showy flowers, and frequently handsome leaves. The superb modern Gloxinia (*see p.* 339) is really a Sinningia (speciosa). A curious hybrid, called Gloxinia Tapeinotes, was raised a few years ago between S. Carolinæ (barbata) and a spotted Gloxinia, but the cross has not proved of much practical value. (For culture, *see* GLOXINIA.)

Principal Species, Hybrids, and Varieties :—

Carolinæ, sum., st., wh., red blotches, lvs. often 1′ long, crim. below (*syns.* barbata and Tapeinotes Carolinæ).
— major, larger.
concinna, st., sum., aut., lvs. pur. and yel., small, nearly round (*syns.* Stenogaster concinna of *Botanical Magazine* 5253, and Stenogastra concinna).
— multiflora, lil., bl., lvs. larger, drooping (*syn.* Stenogastra multiflora).
conspicua, 1′, st., sum., yel., dotted pur., lvs. heart shaped, floriferous (*syns.* Biglandularia and Rosanowia conspicua).
speciosa, Sep., st., vio.; many hybrids and vars. (*syns.* Gloxinia Passinghamii and speciosa, and Ligeria speciosa). The Gloxinia. The following are a few well-marked vars.
— albiflora, wh. (*syn.* Gloxinia speciosa albiflora of *Botanical Magazine* 3206).
— caulescens, lvs. larger (*syn.* Gloxinia caulescens).
— rubra, red, very fine (*syn.* Gloxinia rubra).
youngiana, 1′ to 1½′, sum., st., vio. or pur., with a yellowish wh. throat; hybrid (speciosa × velutina).

Other Species :—

guttata, 1½′, Je., st., pale grn., spotted pur., lvs. velvety.
Helleri, 3″ to 4″, Je., st., red and wh., pur. spotted, 3″ long, lvs. velvety (*syn.* velutina of *Botanical Magazine* 4212).
hirsuta, prostrate, Jy., st., lil., dotted vio. (*syn.* Gloxinia hirsuta).
menziesiana, Aug., st., vio., dotted red, lvs. heart shaped (*syn.* Gloxinia speciosa Menziesii of *Botanical Magazine* 3943).
velutina, 1½′, Je., st., pale grn., lvs. with pur. veins.

SIPHOCAMPYLUS (*syn.* LOBELIA of PRESL.).

A large genus (*ord.* Campanulaceæ) of stove and greenhouse herbs and sub-shrubs, some being climbers, but comparatively few of them finding a place in collections. Propagation, by cuttings. Soil, turfy loam and peat in equal parts, with sand.

Principal Species :—

betulæfolius, 3′, Jy., st. per. herb, red.
coccineus (now Centropogon coccineus).
glandulosus, 3′, Jy., st. per. herb, ro.
humboldtianus, 3′, sum., st. per. herb, sc., very showy.
manettiæflorus, 1′, Ap., st. sub-shr., red, yel. (*syn.* nitidus).

Other Species :—

amœnus (*see* villosulus).
bicolor (now Lobelia laxiflora angustifolia).
canus (*see* macropodus).
crenatifolius, 3′, sum., grh. or st. shr., sc., yel.
fimbratus (*see* longepedunculatus).
giganteus, 14′ to 16′, Jy., st. per. herb, red, yel.
hamatus, 6′, Je., grh. per. herb, vio.
lantanifolius, 3′, Jy., st, pur.; glabriusculus is a var.
longepedunculatus, 3′, Jan., st. per. herb, pur. (*syn.* fimbriatus).
macropodus, 2′ to 3′, Je., st. per. herb, bl., red (*syn.* canus).
microstoma, 2′ to 3′, Sep., st. sub-shr., sc.
nitidus of gardens (*see* manettiæflorus).
orbigyianus, 2′ to 3′, Jy., st. per. herb, yel., red.
peduliflorus, 2′, Jy., st., sc.
scandens, Jy., st. shr., sc.
surinamensis (now Centropogon surinamensis).
villosulus, 3′, Je., grh., red, or. (*syn.* amœnus).

SIPHONOPHORA.

Aphides or Greenflies with very long honey tubes. Rosæ is destructive of Roses. Syringing with soapy, or tobacco, water is the best remedy.

SIREX. (WOOD WASP.)

The larvæ of this genus of Sawflies tunnel in the wood of various Conifers, and frequently do a considerable amount of damage. The two best known British species are juvencus, the Steel-blue Sirex, which prefers the Scotch

Sinapis (*see Brassica*).

Siphonandra (*see Chiococca*).
Siphonantha (*see Clerodendron*).
Siphonia (*see Hevea*).

Fir, although it does not confine its ravages thereto; and gigas, the Giant Sirex, which lives in the Spruce, Silver Firs, and Larches. Gigas is black, ringed with yellow, while juvencus is almost uniformly dark steel blue, although parts of the male are dull red. The timber of infected trees is of little value, and thus destruction by fire is to be recommended. No dead branches should be allowed to remain lying on the ground.

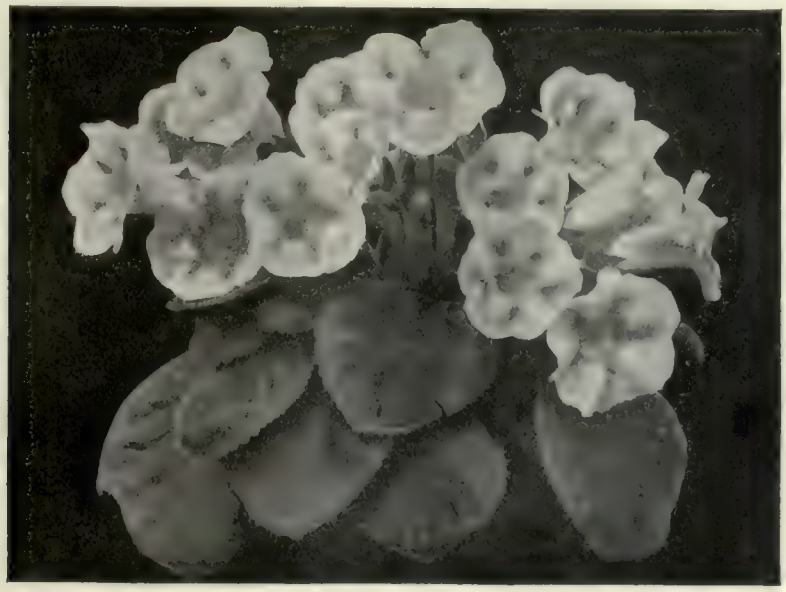
SISYMBRIUM. (Hedge Mustard.)

Hardy herbs, principally annuals or biennials (*ord.* Cruciferæ), of practically no value for the garden.

chilense, 6″ to 12″, Jy., hlf-hdy., pur.
filifolium, 6″ to 8″, My., hlf-hdy. or hdy., wh.
junceum, 9″, Je., hlf-hdy., lil.

SITONA.

A genus of small beetles (Weevils), the most notable species of which are crinita, the Spotted Pea Weevil, and lineata, the Striped Pea Weevil, attacking Leguminous plants. The latter is striped dark and light yellow, while the former is grey and rose with dark spots. The limbs in both species are dull red. The beetles feed upon the leaves, and the larvæ attack the roots of the plants, so that these Sitonas are very injurious in both stages. It is a good plan to encourage the young seedlings to grow quickly into the rough leaf stage. Applications of lime and soot (which *see*) to the soil in autumn are excellent. Watering with petroleum, 2 oz. to 1 gallon of water, has also proved efficacious.



A modern Sinningia (popularly Gloxinia) two years from seed sowing
(*see p.* 338, *and also p.* 374, Vol. I.).

SISYRINCHIUM (*syn.* Souza. Blue-eyed Grass, Satin Flower, Rush Lily, Pig Root.)

A genus of hardy or half-hardy perennials (*ord.* Irideæ), some of which are of considerable beauty in the border, rock garden, frame, or greenhouse. Grandiflorum is one of the prettiest of early flowers. Propagation, by seeds sown when ripe or in spring, and by offsets. Soil, sandy loam, with leaf soil or peat.

Principal Species and Varieties:—

angustifolium, 6″ to 9″, sum., hdy., pale bl.
— anceps, 6″, sum., bl.
Other vars. are mucronatum and Nuttallii.
grandiflorum, 8″ to 12″, spr., hdy., pur. (*syn.* Douglasii). Spring Bell.
— album, wh.
striatum, 1′ to 3′, Je., hdy., yel.

Other Species:—

bermudiana, 1½′ to 2′, sum., hdy., bl.
californicum, 1′ to 2′, aut., hlf-hdy. or hdy., yel.

Sirrastylis (*see Serrastylis*).
Sissoo Wood (*see Dalbergia*).
Sitolobium (*see Dicksonia*).

SIUM. (Water Parsnip.)

Glabrous hardy herbs (*ord.* Umbelliferæ) of no garden value. The Skirret is Sisarum. Erectum (*syn.* angustifolium) and latifolium are common British ditch weeds.

SKIMMIA.

Ornamental hardy evergreen shrubs (*ord.* Rutaceæ) with whitish flowers, followed by berries, in some cases of considerable beauty, but said to be hurtful if eaten. These shrubs are worthy of being more largely grown. Propagation, by seeds, sown when ripe in peat, loam, and sand; and by cuttings under a bell-glass, in heat, and in sand or very sandy loam. Soil, peat and loam. It is essential that both male and female plants should be planted for the production of berries.

Principal Species and Varieties :—

Fortunei, 1′ to 3′, spr., greenish wh., buds tinted red (*syns.* japonica of gardens and *Botanical Magazine* 4719 [not Thunberg] and rubella of Carrière).

japonica, 3′ to 4′, spr., wh. (*syns.* Foremanni of gardens and oblata of Moore). Vars. are fragrans of Carrière, fragrantissima of gardens, intermedia of Carrière, oblata var. ovata of Carrière, oblata var. Veitchii of Carrière, and Rogersii of gardens.

Laureola, 4′, spr., pale yel.; citron scented (*syns.* Laureola fragrans of Roem., and Limonia Laureola of Wall).

oblata (*see* japonica).

SKIRRET.

This rather uncommon vegetable (Sium, or Pimpinella, Sisarum, *ord.* Umbelliferæ) has white, fleshy, forking roots, which may be cooked in the same fashion as Salsafy. Propagation, by cuttings of the side shoots in spring, as with Seakale, or by seeds sown in drills 1′ apart in early April. The seedlings are subsequently thinned to 6″ apart; this distance will also do for the root cuttings. A light, fairly rich soil, but not recently and heavily manured, is suitable. The roots are fit for lifting in September, and they may be dug up as required, or the whole crop lifted and stored under cover as with "roots" generally.

SLIP.

The term "slip" is rather loosely applied by the gardener. As commonly employed it is synonymous with cutting (which *see*). It is also intended to mean a shoot pulled off, and which, although not pared like a cutting, is nevertheless inserted to make roots. Strictly speaking, a slip is a shoot that has been pulled from the parent plant and has a few roots attached. Thus, when perennial herbaceous Lobelias are lifted in autumn, started under glass in spring, and the shoots pulled apart and potted up, each of these shoots is a slip. The common Box may be readily increased by slips.

SLOANEA.

Stove trees (*ord.* Tiliaceæ). Propagation, by cuttings of ripe shoots, in sand, under a bell-glass, with bottom heat. Soil, loam and sandy peat in equal parts.

Principal Species :—

dentata, 50′, Aug., Nov., st., wh., large.

sinemariensis, 50′, sum., st., wh., small.

SLUGS.

Molluscs, of which several genera are plentifully represented in British gardens. The following is a list of some of the most common and destructive species :—

Arion ater, affects roadsides and waste places, blk., reddish blk. Black Slug.

— hortensis, smaller, striped grey. Garden Slug.

Limax maximus, the largest, 4″ to 6″ long, spotted blk.

— agrestis. Field Slug.

— Arborum. Tree Slug.

— flavus. Yellow Slug.

— Sowerbii. Keeled Slug.

In all the species of Limax and Arion the body is apparently naked, the shell being reduced to the swollen "mantle" in front. The tongue is used for cutting the food, the horny teeth for masticating it.

The ravages of slugs amongst almost all sections of garden plants are too well known. The plants they are attacking may be examined carefully by lamp light, for the pests are chiefly night feeders. Or traps of Cabbage and Lettuce leaves or pieces of Apple or Potato may be laid and examined, also by night. When the pests are caught they may be crushed under the foot or dropped into hot brine, gas water, or quicklime. If quicklime is used, it, with the slugs, should be consigned to the fire directly the collection has been finished, for the slugs, if left in the lime, simply slough off their outer skin and crawl off apparently little the worse. Common salt is useful, but its acridity renders it impossible to bring it into close contact with the plants in any quantity. Dusting seedlings with air-slaked lime, giving just enough to whiten the leaves and the ground immediately surrounding, is to be recommended. Repeated applications may be made without fear of damaging the plants. Soot employed in the same way is good, but not so good as lime; still, a ring of soot round a choice plant is often an effectual bar to the attentions of slugs. Hand-picking on heavy soil in wet weather is hazardous, for the trampling does the land almost as much harm as the slugs would do to the plants. A ring of notched zinc, or of woven brass wire such as is used in fine sieves, is the best for choice plants.

Where slugs make a set at fruit trees a horsehair rope twisted about the stem will prevent their ascent, or the ring of soot or lime may be utilised.

SLUGWORMS.

These are the larvæ of Sawflies, belonging to the genus Eriocampa, and the name is due to their slug-like appearance and behaviour. These larvæ are covered with a powdery or slimy secretion which varies in colour from white to black and yellow. The insects are small, black, and glossy. The principal species are annulipes, leaves of the Oak, Lime, Willow, and Birch; limacina (Selandria Cerasi), Cherries, Pears, and Quinces; ovata, Alder; and Rosæ, Roses. Limacina and Rosæ are the two most troublesome. The former is single-brooded in this country, double-brooded in America. The larvæ are full fed by the end of June or the beginning of July. Dusting with freshly slaked lime and spraying with Paris Green are the two best remedies. Lime water 15 gallons and soft soap 1 lb. form an excellent spraying mixture. The pupæ may be thinned down in autumn and winter by removing the top 4″ of soil beneath the attacked fruit trees and burning it.

SMALL TORTOISESHELL.

This handsome and bright-hued butterfly (Vanessa polychloros) is occasionally troublesome to the fruit grower, but it is too scarce to do a great deal of damage.

SMEATHMANNIA.

Six species of beautiful stove shrubs (*ord.* Passifloreæ), few of which are grown. Propagation, by cuttings of half-ripened shoots under a glass in

Skinnera (*see Fuchsia*).
Skinneria (*see Ipomœa*).
Skull-cap (*see Scutellaria*).
Skunk Cabbage (*Symplocarpus fœtidus*).
Sleepy Disease (*see Tomato*).
Slipperwort (*see Calceolaria*).
Sloe (*see Prunus spinosa*).
Slow Match Tree (*Careya arborea*).

Smallreed (*see Calamagrostis*).

sand in heat. Soil, loam and peat, with a dash of sand.

Principal Species :—

lævigata, 6′, Jy., wh. pubescens, 6′, Feb., wh.

SMILACINA. (False Solomon's Seal.)

Perennial herbs, generally hardy (*ord.* Liliaceæ), with small flowers. Propagation, by division in spring or autumn and by seeds. Light soil in a shady position.

Principal Species :—

bifolia (now Maianthemum Convallaria).
borealis (now Clintonia borealis).
canadensis (now Maianthemum Convallaria).
oleracea, 4′, My., whitish ro. (*syn.* Tovaria oleracea).
racemosa, 2′ to 3′, My., wh. (*syn.* Tovaria racemosa). False Spikenard.
stellata, 1′ to 2′, My., wh. (*syns.* Convallaria stellata and Tovaria stellata).
uniflora (now Clintonia uniflora).

SMILAX. (American China Root.)

A large genus of stove, greenhouse, or hardy climbing shrubs (*ord.* Liliaceæ) of considerable economical value, as Sarsaparilla is made from the roots of several species; rootstocks of China form part of the food of some of the Chinese, and a liquor resembling beer is made in Carolina from the rootstocks of pseudo-China. Propagation, by division or seeds. Soil, sandy loam. For Smilax of gardens, *see* Asparagus medeoloides.

Principal Species and Varieties :—

aspera, 5′ to 20′, Jy., hdy. or hlf-hdy., wh. or flesh (*syn.* sagittæfolia).
— angustifolia, lvs. narrow.
— mauritanica, hlf-hdy., greenish yel. (*syn.* mauritanica); the best form.
— punctata, lvs. spotted wh.
auriculata, hlf-hdy., wh., fragrant.
China, 30′, Aug., hdy., greenish wh. China Root.
glauca, 3′, Jy., hdy., greenish wh. (*syn.* Sarsaparilla of Linnæus in part).
ornata, 3′, grh., lvs. spotted silvery grey on grn. (*syn.* macrophylla maculata).
pseudo-China, Jy., hdy., grn.
rotundifolia, Je., hdy. or hlf-hdy. cl., grn. (*syn.* quadrangularis).

Other Species and Varieties :—

argyræa, st. cl., lvs. grn., spotted wh.
australis, 3′ to 6′, sum., grh., wh. or grn. and pur. (*syn.* latifolia).
Bona-nox, 5′ to 10′, Je., hlf-hdy., greenish wh. (*syn.* hastata of Willdenow).
— hastata, lvs. narrower, margined with spines.
— rubens, tendrils pur., lvs. less prickly.
discolor, grh. or st., lvs. blotched purplish br.
glyciphylla, sum., grh. Botany Bay Tree and Tea.
herbacea, Je., hdy. cl., malodorous. Carrion Flower.
—Simsii, lvs. more pointed (*syn.* herbacea of *Botanical Magazine* 1920).
lanceolata, 15′, Je., hdy., grn., wh.
latifolia (*see* australis).
macrophylla ornata (*see* ornata).
salicifolia variegata, grh., lvs. margined wh. between ribs (*syn.* longifolia foliis-variegatis).
Shuttleworthii, st. cl., lvs. deep grn., large, blotched silvery grey.

SMITHIA.

Stove herbs, sub-shrubs, and shrubs (*ord.* Leguminosæ), with pinnate leaves, and usually yellow, occasionally purple or violet flowers. Propagation, by seeds sown in a warm frame. Soil, loam and peat in equal parts, with sufficient sand to secure porosity.

Smeloskia (*see Smelowskia*).

Principal Species :—

purpurea, 6″ to 12″, sum., st. ann., pur., marked wh.

SMUT.

A group of microscopic Fungi (Ustilaginaceæ) which infest the leaves and flowers of many plants, especially Grasses. The spores in most cases vary from dark brown to sooty black. The closely packed and interwoven mycelial hyphæ carry large quantities of spores, and it is at the time that the tissues of the host plants are ruptured to admit of the extension of these masses of spores that the sooty appearance is most noticeable. As the parasites live within the tissues of the host plants external spraying is only of use as a deterrent to infection, but these smuts are so widespread that spraying is attended with difficulty. The destruction by fire of infected plants is the best remedy.

Chief Smuts and Plants Attacked :—

Ustilago violacea and Sorosporium Saponariæ. Anthers of many members of Caryophylleæ.
— hyalinum. Seeds of Astragalus glycyphyllus and Convolvulus Sepium.
— primulicolum. Seeds of Primula elatior, P. farinosa, and P. vulgaris.
Urocystis Violæ. Viola odorata.
— Anemonæ. Anemones and other members of Ranunculaceæ.
— sorosporoides. Thalictrum minus.

Smuts from coal fires exercise an injurious effect upon plants, as they stop up the pores of the leaves and hinder their working. The free use of the sponge and syringe is necessary to keep the plants in health.

SNAILS.

The snail has a large and conspicuous shell, which forms an admirable shelter for the inmate. Almost all the snails injurious to garden crops belong to the genus Helix, and although they are not often so troublesome as the ubiquitous slug they occasionally work a good deal of damage. Pomatia, the Apple Snail, has a dull, yellowish white, spirally brown striped shell 2″ across. Hortensis (*syn.* aspera) is the common species, and its yellowish brown shells frequently reach 1½″ in diameter. Nemoralis is another British species, but it is to be sought for more amongst the weeds in the hedgerows than in the garden. Where snails are numerous hand-picking is the best remedy. Cold weather does not hurt the pests in the slightest. On its approach they close the entrance to the shell and remain without motion for indefinite periods. Thrushes and Blackbirds are fond of snails; so also is the farmyard duck. A few ducks will soon clear out all the snails. For trapping, *see* Slugs.

Smoke Plant (*see Rhus Cotinus*).
Smoke Wood (*see Clematis Vitalba*).
Smooth Flower (*see Leianthus longifolius*).
Smooth-fruited Horse Chestnut (*see Æsculus and Pavia*).
Snail Flower, Climbing (*Phaseolus Caracalla*).
Snake Gourd (*Trichosanthes Anguina*).
Snake Millipedes (*see Millipedes*).
Snake Plant (*see Dracunculus*).
Snake's Beard (*see Ophiopogon*).
Snake's Head (*see Fritillaria Meleagris, Iris tuberosa, and Hermodactylus*).
Snake's Mouth Orchid (*see Pogonia ophioglossoides*).
Snake's Tongue (*see Ophioglossum*).
Snake Weed (*Polygonum Bistorta*).
Snake Wood (*see Cecropia and Strychnos*).

SNAPDRAGON (*see* ANTIRRHINUM).

SNOWDROP (*see* GALANTHUS).

SNOWFLAKE (*see* LEUCOJUM).

SOAP-BOILERS' ASHES.

Although these are sometimes recommended as manure they really have very little manurial value. When raw they are positively injurious. In this state they are composed of carbonate, sulphuret, and sulphite of lime. If exposed to the atmosphere for a few days the sulphuret and sulphite absorb more oxygen and become sulphate of lime, or gypsum. They may be applied to land that is deficient in lime, but for heavy land the "hotter" forms of lime are to be preferred.

SOBOLEWSKYA.

Hardy annual herbs (*ord.* Cruciferæ) of erect, branching habit. Propagation, by seeds sown outdoors. Ordinary garden soil.

Only Species :—

clavata, My., hdy., wh., numerous.
lithophila, sum., hdy., wh. (*syn.* lithophylla of *Kew Hand-List*).

SOBRALIA.

Description.—Tall-growing Orchids (*ord.* Orchidaceæ), with leafy, Reed-like stems which do not become pseudo-bulbous, and very thick, fleshy roots. The large, showy flowers are produced from the tips of the stems, and though fleeting there is a succession of them. All are exceedingly easy to grow. They like the heat of the warmest houses, but will do in an intermediate temperature.

Propagation and Soil.—By division and imported pieces. The plants are wholly terrestrial, and thus the compost must be substantial. Fibrous peat and loam in equal proportions, with sand and a few pieces of charcoal, will suit. Free drainage.

Other Cultural Points.—The plants must never be dried off, although in winter the supply of moisture may be reduced. Liquid cow manure just before flowering is useful. They may be grown with a mixed collection of stove plants.

Principal Species and Varieties :—

[NOTE.—s. = sepals, p. = petals, l. = lip.]

leucoxantha, 2′ to 5′, sum., s. and p. wh., shaded cream, l. wh., yel., or.
Lindenii, 1′ to 1½′, deep pur.
Lowii, 1′ to 3′, aut., pur. ro.
lucasiana, 3′ to 5′, sum., s. and p. wh., l. rosy pur., throat yel., large and fine.
macrantha, 3′ to 8′, sum., crim. pur., l. with a wh. throat, shaded yel.; the finest. Many vars.
— albida, sum., s. and p. creamy wh., l. soft pur.
— Hodgkinsonii, sum., rosy lil., l. rosy pur., with yel. throat; very distinct.
— kienastiana, sum., large, pure wh. (*syn.* alba).
— nana, 1′ to 3′, sum., vio. pur., throat yel., smaller than type.
— purpurea, pur.
— Schröder's var., sum., deep crim. pur., or., throat yel.
— splendens, sum., darker. Woolley's var. is a dwarf form.
Princess May, 2′ to 4′, sum., s. and p. blush wh., l. ro., mauve, throat yel.; near macrantha.
sanderiana, 3′ to 8′, sum., s. and p. wh., flushed ro., l. rich crim. pur., throat yel.
xantholeuca, 3′ to 8′, sum., s. and p. creamy yel., l. darker yel.
— rubra, sum., crim., throat yel.
— superba, sum., creamy yel., throat or., br.
— Wigan's var., sum., creamy wh., throat yel., flowers pk. when young.

Principal Hybrids :—

amesiana (xantholeuca × wilsoniana), rosy lil., throat bright yel., large.
dellense (leucoxantha × Lowii), s. wh., p. rosy lil., l. rosy lil., crimped.
Veitchii (macrantha × xantholeuca), s. and p. ro., blush, l. rosy lil.
— aurea, all segments suffused yel., very pretty.
Wiganiæ, probably a natural hybrid (xantholeuca × ?) yel., flushed ro., large.

Other Species and Varieties :—

Brandtiæ, 2′ to 5′, sum., pur., ro., l. or. disc.
Cattleya, 4′ to 12′, pur. ro., l. with or. disc.
chlorantha (*see* macrophylla).
decora, 2′, sum., s. and p. wh., l. ro. (*syns.* galeottiana, and sessilis of *Botanical Magazine* 4570).
dichotoma, 6′ to 20′, Mch., wh., vio., ro., pur.; splendid, but rare.
fragrans, 12″, sum., small, creamy wh.
Holfordii, 2′ to 5′, aut., rich rosy car.
Liliastrum, 8′ to 10′, aut., wh., veined yel. (*syn.* Epidendrum Liliastrum).
— rosea, ro., veined wh.
macrophylla, 1′, Je., yel., 4″ long (*syn.* chlorantha).
rosea, 3′ to 6′, sum., s. and p. ro., mauve, l. crim., ro. (*syn.* Ruckeri).
Ruckeri of Linden (*see* rosea).
Ruckeri (Lind. and Reich), 4′ to 6′, sum., wh., l. lil. ro.
Sanderæ, 3′ to 5′, aut., s., p., and l. sulphur wh., throat yel.
sessilis of Lindley, 1′ to 3′, aut., deep ro.
virginalis, sum., wh., flushed ro., l. frilled.
Warscewiczii, bright pur.
wilsoniana, 3′ to 6′, sum., blush wh., throat yel.

SOCRATEA. (ZANONA PALM.)

A small genus of stove Palms (*ord.* Palmæ). Exorrhiza, 60′, is the only cultivated species.

SOILS (*see* COMPOSTS).

SOLANDRA.

A small genus of beautiful climbing stove shrubs (*ord.* Solanaceæ), of attractive appearance when in bloom. Propagation, by cuttings, in heat, in light soil. Cuttings of the flowering shoots will give small, blooming plants. Soil, good loam. The plants should have liberal treatment in their early stages, afterwards withholding water until the leaves begin to drop. This drastic treatment generally induces the Solandras to flower profusely.

Principal Species :—

grandiflora, 15′, Mch., cream, pur. marks inside. Peach Trumpet Flower.
guttata, 10′, Mch., pale yel. throat, pur. spots.
lævis (*see* longiflora var.).
longiflora, 6′, Nov., wh., tinged pur. (*syn.* lævis).
viridiflora, 3′, My., grn. (*syn.* Dissochroma viridiflora).

Snapweed (*see Impatiens*).
Sneezewood (*Pteroxylon edule*).
Sneezewort (*see Achillea Ptarmica*).
Snowball Tree (*see Viburnum Opulus sterilis*).
Snowberry (*see Chiococca and Symphoricarpus*).
Snowdrop Mildew (*see Galanthus*).
Snowdrop Tree (*see Halesia tetraptera*).
Snowdrop Tree, African (*see Royena lucida*).
Snowdrop Windflower (*see Anemone sylvestris*).
Snowflower (*see Chionanthus*).
Snow, Glory of the (*see Chionodoxa Luciliæ*).
Snow-in-Summer (*see Arabis alpina and Cerastium tomentosum*).
Snow Pear (*see Pyrus sinensis*).
Snow Tree (*see Pyrus nivalis*).
Soap Plant (*Chlorogalum pomeridianum*).
Soap Tree (*see Gymnocladus chinensis*).

Soapwort (*see Saponaria*).
Soyalgina (*see Tridax*).
Soja (*see Glycine*).

SOLANUM.

Description.—An important and extensive genus of stove, greenhouse, half-hardy, and hardy shrubs, herbs, or small trees (*ord.* Solanaceæ), many of which are of high decorative value, and some of considerable economic importance. The most valuable is the Potato, tuberosum (*see* POTATO), but Melongena produces the Aubergine (*see* EGG PLANT), and from experiments in progress it is expected that hybridisers may obtain important results in crossing other species with tuberosum. Apart from tuberosum and Melongena, the species are principally of decorative merit, consisting either of effective bloom, striking habit and foliage, or ornamental fruits. In the first category the ornamental crispum may be named; marginatum or Warscewiczii is decorative for the greenhouse or sub-tropical gardening, and the popular Capsicastrum and pseudo-capsicum, with their numerous bright berries, make favourite table plants. Young plants may be grown out of doors during the summer in a sunny border, and potted in autumn.

Propagation. — The annuals by seeds; the tuberous-rooted by the tubers or by seeds; the shrubby species by seeds or by young cuttings struck in a close case.

Soil.—Light, rich loam.

Photo: Cassell & Company, Ltd.

SOLANUM WENDLANDII (*see p.* 344).

Principal Species and Varieties:—

atropurpureum, sum., grh. sub-shr., pur., yel., fruit wh., yel.
Capsicastrum, 1′ to 2′, sum., grh. sub-shr., wh., fruit sc.
— variegatum, variegated lvs.
cernuum, 15′, sum., grh., wh. (*syn.* jubatum).
crispum, 12′ to 14′, sum., hdy. shr. (wall), bl., pur., fruit yel., wh.
— ligustrinum, narrower lvs., fewer flowers (*syn.* ligustrinum).
duplosinuatum, sum., grh., bl., fruit wh.
giganteum, 10′ to 25′, sum., grh., bl.
jasminoides, sum., grh. cl., bl. wh.
— floribundum, smaller lvs., more flowers.
— foliis-variegatis, lvs. blotched creamy wh.

marginatum, 3′ to 4′, sum., grh., wh., pur., fruit yel.
Melongena, 2′ to 3′, sum., grh. ann., bl., fruit wh., yel., or pur. (*syn.* esculentum. For culture and vars., *see* Egg Plant). Egg Plant, Jew's Apple, Mad Apple.
pensile, spr., sum., warm grh. cl. shr., pur.
pseudo-capsicum, 4′, sum., grh. shr., wh., fruit sc. or yel.
— nanum, dwarf habit.
— rigidum, hybrid, fruit or.
— Weatherilli, fruit or., oval, pointed.
pyracanthum, 3′ to 6′, sum., grh. sub-shr., vio., ornamental prickles.
robustum, 2′ to 4′, sum., grh. shr., wh., fruit or., handsome sub-tropical plant.
seaforthianum, sum., grh. or st. per. cl., lil., fruit yel., red.
sisymbrifolium, 4′, sum., grh. ann. or per., bl. or wh., fruit red (*syns.* Balbisii and decurrens).
— acutilobum purpuriflorum, pur.
— bipinnatipartitum, wh. or pur. (*syn.* Balbisii bipinnatum).
tuberosum. The Potato.
— demissum (*syn.* demissum).
— etuberosum, no tubers (*syn.* etuberosum).
— variegatum, lvs. variegated.
— verrucosum (*syn.* verrucosum).
Warscewiczii, 3′, sum., hlf-hdy. per., wh., ornamental red prickles.
Wendlandii, My. to Sep., intermediate cl. shr., lil., bl. (*see p.* 343).
Worsleyi, 3′, sum., grh., wh., fruits large, egg-shaped, red (*see p.* 345).

Other Species and Varieties :—

acanthodes, 3′ to 6′, sum., st., bl., pur.
æthiopicum, 1′ to 2′, sum., hdy. ann., wh., fruit red.
albidum Poortmanni, aut., hlf-hdy. per., wh.
amazonium, 3′ to 4′, st. per., bl., yel.
Anguivi of Hooker, not De Candolle (*see* indicum).
anthropophagorum (*see* Uporo).
asarifolium, sum., st. per. creeper, wh.
auriculatum, sum., hlf-hdy. ann., vio., fruit red.
aviculare, 6′, sum., grh. shr., vio., fruit grn., yel. Kangaroo Apple.
Balbisii (*see* sisymbrifolium).
betaceum (*see* Cyphomandra betacea).
campanulatum, 2′ to 3′, sum., grh. per., vio. or bl.
cardiophyllum, 3′, sum., hdy. or hlf-hdy. per., wh.
cernuum, 8′, sum., st., wh. (*syn.* jubatum).
chrysotrichum, sum., st. per., pur.
Commersonii, 2′, late sum., hdy. or hlf-hdy. per., lil. or wh., tuberous (*syn.* Ohrondii).
cornigerum, sum., st. cl., vio., fruit yel. (*syn.* corniculatum of gardens).
cornutum, 4′, sum., grh. herb., yel., not of gardens.
— of gardens (*see* rostratum).
crinitum, 5′, sum., grh., wh.
cyananthum, 6′, sum., grh., bl.
dammannianum, 8′, sum., grh., bl., fruit yel.
Duchartrei, st. shr., pur., prickly.
Dulcamara, 4′ to 6′, sum., hdy. per., trailing, pur. or wh., fruit red or yel., grn. Bitter Sweet, Woody Nightshade. Dulcamara, Felonwood.
elæagnifolium, 4′, grh., vio. or wh. (*syn.* saponaceum of *Botanical Magazine* 2697).
fontanesianum. 4′, sum., hdy. ann., yel.
fragrans (now Cyphomandra fragrans).
glaucum, 6′, sum., st. per., bl. (*syn.* glaucophyllum).
guineense, 4′, sum., hlf-hdy. ann., vio.
havanense, 4′ to 7′, sum., st. shr., bl., fruit bl. (*syns.* coriaceum and hookerianum).
hybridum, 2′, st. sub-shr., pale bl.
— Hendersoni, wh., fruit or. red., oval.
indicum, 2′ to 6′, sum., st. sub-shr., bl., fruit yel. (*syn.* Anguivi of Hooker's Exotic Flora).
Jamesii, 9″, sum., hdy. or hlf-hdy. tuberous per., wh.
jubatum (*see* cernuum).
lanceolatum, 6′, sum., st., bl., fruit or.
lasiophyllum, 2′ to 3′, sum., grh. shr., pur.
lycioides Iodasterum, 4′, sum., st., vio., yel., pur. (*syn.* lycioides).
macrantherum, sum., grh. cl., vio., fruit red.
macranthum of *Botanical Magazine* 4138 (*see* maroniense).
macrocarpon, 3′, sum., grh. shr., bl., fruit yel. (*syn.* Mors-elephantum).
Maglia, 1½′, sum., hdy. or hlf-hdy. tuberous per., wh.
maroniense, 5′ to 14′, sum., st., vio. (*syn.* macranthum of *Botanical Magazine* 4138).
Monteiroi, st. shr., pur., fruit pur., edible.
Mors-elephantum of gardens (*see* macrocarpon).
muticum, 4′, sum., grh. shr., vio., fruit red.
myrtifolium, 3′, sum., grh., bl.
nigrum, 6″ to 24″, sum., hdy. ann., wh., fruit black, yel., or red.
— miniatum, fruit sc.
platanifolium, 4′, sum., grh. sub-shr., vio., fruit grn., wh., yel.
quercifolium, 4′, sum., hlf-hdy. per., vio.
quitoense, 4′ to 6′, sum., grh., vio., wh., fruit edible.
rostratum, 6′, sum., grh., yel. (*syn.* cornutum of gardens).
runcinatum, 2′, sum., grh. per., pur., red.
saponaceum of *Botanical Magazine* 2697 (*see* elæagnifolium).
somniculentum, 1½′, sum., grh., vio.
stelligerum, 5′, sum., grh. shr., bl.
texanum, 1′, sum., hlf-hdy. ann., pale vio., fruit sc. (referred to integrifolium by *Index Kewensis*).
— ovigerum, per., fruit large, red.
Tomatillo, aut., win., grh. shr., pur.
Torreyi, 2′, sum., hlf-hdy. per., vio. or wh.
torvum, 8′, grh. shr., wh., fruit yel. (*syn.* ferrugineum).
trilobatum, 2′ to 5′, sum., st. shr., vio., bl., or wh.
tweedianum, 1½′, sum., grh. per., pale bl. or wh.
uncinellum, st. trailing per., ro.
Uporo, 6′, st., wh. fruit red, like Tomatoes Cannibal's Tomato.
venustum (*see* seaforthianum).
Wallisii, 2′, sum., st. or grh., pur., fruit vio.

SOLARIA (*syn.* Symea).

A curious little greenhouse bulbous plant (*ord.* Liliaceæ). Propagation, by seeds and offsets. Keep the bulbs dry when resting. Soil, sandy loam two parts, leaf mould one part.

Only Species :—

miersioides, 4″, spr., grh., grn., small (*syn* Symea gillesioides).

SOLDANELLA. (Blue Moonwort)

A small genus of charming hardy Alpine perennials (*ord.* Primulaceæ), with rounded, heart shaped leaves and pretty, drooping flowers. Propagation, by seeds, sown when ripe or in spring in pots of fine soil in a frame, or by division after flowering. Soil, loam and peat, with a top-dressing of equal parts of leaf soil and sand, in spring and autumn. The edge of a bog is a good place for the Soldanellas, but failing this a low position on the rockery, with plenty of water in summer. Alpina should be covered with a sheet of glass from October to March, or cold wet winters may kill it.

Principal Species and Varieties :—

alpina, 3″, Ap., bl. (*syn.* Clusii of Schmidt, not Gaud.).
— pyrolæfolia, more free blooming (*syn.* pyrolæfolia).
— Wheeleri, resembles latter.
hybrida, 2″, Ap., bl. (alpina × pusilla).
minima, 2″, Ap., lil., pur. striped inside.
— of Hoppe (*see* pusilla).
montana, 3″, Ap., pur.
pusilla, 2″, Ap., bl. (*syn.* Clusii of Gaud., not Schmidt).

Solena (*see Posoqueria*).

SOLENIDIUM.

A stove, epiphytic Orchid (*ord.* Orchidaceæ), with a quaint crest to the lip of the flower. It has affinities with the Oncidiums, like which it may be treated.

Only Species :—

racemosum, 6″, Nov., yel., spotted red.

SOLENOMELUS.

Hardy rhizomatous plants (*ord.* Irideæ). They make handsome tufts, with many, if rather fugitive, flowers, and may well be associated with habit, but some are very decorative in late summer and autumn. Propagation, by division at almost any season, and by seeds sown in spring. Soil, rich, rather moist, well supplied with manure. They exhaust the ground rapidly, but are suitable for the back row of the herbaceous border.

Principal Species and Varieties :—

Drummondii, 1′ to 3′, sum., yel.
lanceolata, 2′ to 3′, Sep., yel.
speciosa, 3′ to 6′, Oct., yel.
Virgaurea, 1′ to 3′, Aug., yel.
— cambrica, 2″ to 6″, yel.
— nana, 2′, yel.

Photo: Cassell & Company, Ltd.

Solanum Worsleyi (*see p.* 344).

the Irises and Sisyrinchiums. Propagation, by division in autumn or spring. Soil, light and rich, in a warm and sheltered position.

Principal Species :—

chilensis, 1′ to 1½′, Je., hdy., yel., stems leafy (*syns.* Sisyrinchium longistylum).

SOLENOPHORA.

Stove evergreen shrubs (*ord.* Gesneraceæ). Rare in cultivation. Propagation, by seeds. Light, rich soil, with free drainage.

Principal Species :—

endlicheriana, 1′ to 2′, Ap., st., or., dotted pur., stem emits aërial roots (*syn.* Arctocalyx endlicheriana).

SOLIDAGO. (Golden Rod.)

A large but confused genus of perennial herbs (*ord.* Compositæ), generally hardy, and adapted for borders or wild gardens. Many are coarse in

Other Species :—

californica, 2′ to 4′, sum., yel.
canadensis, 3′ to 6′, Aug., yel. (*syn.* nutans).
fragrans of gardens (*see* serotina).
Gattingeri, 2′, Sep., yel.
littoralis, 2′, sum., yel.
— grandiflora, taller.
multiradiata, 3′, Jy., yel.
odora, 2′ to 3′, Jy., yel.
patula, 2′, Aug., yel.
rigida, 3′ to 5′, Sep., yel.
rugosa, 2′ to 7, Aug., yel. (*syn.* altissima of Aiton).
sempervirens, 1′ to 6′, Sep., yel.
serotina, 3′, Aug., yel. (*syns.* fragrans of gardens, and glabra).
Shortii, 2′ to 4′, Sep., yel.
ulmifolia, 2′ to 5′, Aug., yel. (*syn.* multiflora).

SOLLYA.

Very ornamental evergreen twiners or climbers (*ord.* Pittosporeæ), with nodding flowers and narrow leaves. Though usually grown in the greenhouse, the beautiful heterophylla can be grown in the south on a warm wall or on the front of a greenhouse or stove. Propagation, by cuttings under a bell-glass in sand. Soil, well-drained loam and peat.

Only Species and Varieties :—

angustifolia (now Billardiera scandens).
heterophylla, 6′, Jy., bl. Australian Blue Bell Creeper.
— angustifolia, lvs. narrower (*syn.* linearis).
— salicifolia, lvs. narrow.
parviflora, Jy., bl. (*syn.* Drummondii of some).

SOLOMON'S SEAL (*see* POLYGONATUM).

SONCHUS. (SOW THISTLE.)

The greater number of the Sonchuses are undesirable weeds, and the natives, arvensis, or Corn Sow Thistle, oleraceus, the Hare's Lettuce and Milk Thistle, once used in the kitchen as a potherb, and palustris, are too troublesome to be given a place in the garden. The undernamed are recommended as good foliage shrubs (*ord.* Compositæ) for growing under glass. Propagated by cuttings under a bell-glass or hand-light in a house. Common garden soil.

Principal Species :—

arboreus, stem tree-like.
congestus, 1′ to 2′, Mch., yel. (*syn.* Jacquinii of *Kew Hand-List*).
gummifer, 3′, sum.
Jacquinii of *Kew Hand-List* (*see* congestus).
leptocephalus, Je., lvs. deeply cut; a pretty plant.
pinnatus, 3′, sum., pretty, lvs. finely divided.
radicatus, 1′, sum., good foliage plant.

SONERILA.

Stove herbs or small shrubs (*ord.* Melastomaceæ), of which several species are commonly met with in collections. Margaritacea and its varieties are favourite edging plants. Propagation, by cuttings in a warm frame in sandy soil. It is well to raise young stock frequently, as the young plants are far more useful, and have brighter foliage and prettier markings than old ones. Large 60 pots are the most useful size. Soil, fibrous peat, chopped sphagnum, a little sand, and some crushed bricks. A few pieces of fibrous turf may be added if desired. A free supply of water is necessary at all times.

Principal Species and Varieties :—

maculata, ro. or pur., lvs. dark crim., dotted wh. Several vars., including guttulata, picta, and punctata (*syn.* orientalis).
margaritacea, 4″ to 8″, ro., lvs. wh., grn., reddish pur. beneath, stems sc.
— argentea, upper leaf surface silvery grey.
— Hendersonii, 6″ to 8′, st., bright lil., ro., lvs. olive grn., studded pearly wh.
speciosa, 9″ to 12″, st., mauve, lvs. 2″ to 3″ long, grn. (*syns.* elegans and orbiculata). Bensonii is probably a var.

Hybrids.—Of late years numbers of hybrids have been raised characterised by a considerable range of mottling and striping in the leaf. A few of the best are Duchesse de Brabant, François Marchand, Madame van Langenhoe, Mrs. H. Walter, Silver Queen, and Souvenir de Madame van Houtte. Several bigeneric hybrids between Sonerilas and Bertolonias have been raised by Continental nurserymen, and to these the name of Bertonerila has been given.

Other Species and Varieties :—

Bensonii (*see* speciosa var.).
elegans of Hooker (*see* speciosa).
grandiflora, 1′, mauve, stems rather woody.
orbiculata (*see* speciosa).
stricta, 3″ to 7″, rosy pur.

Solomon's Seal, False (*see Smilacina*).

Photo: Cassell & Company, Ltd.

SOPHORA JAPONICA (*see p.* 347).

SONNERATIA (*syn.* AUBLETIA).

Stove shrubs and small trees (*ord.* Lythrarieæ), rare in cultivation. Propagation, by cuttings in a close frame. Soil, sandy peat and loam in equal parts.

Principal Species :—

acida, Je., red, fruits acid, eaten by the Malays as a condiment.
alba, My., wh.
apetala, 40′, Je., wh., a sub-aquatic tree.

SOOT.

Soot varies considerably according to the quality of the combustibles employed and the degree of combustion. As taken from the domestic chimney it contains about 12 per cent. water, 35 to 50 per cent. ash, and the remainder various volatile substances, which can be got rid of by further and complete combustion. In the ash there are calcium, iron, magnesium, potassium, and sodium, the first four of which are essential plant foods, combined with phosphoric and sulphuric acids. Also silicates are present to some extent. The volatile substances referred to are rich in ammonia, and it is the presence of sulphate and chloride of ammonium that invests soot with its principal fertilising qualities.

Its uses in the garden are manifold. As a nitrogenous manure it is in high favour, whether applied in the powder form to the land and dug in, or given as a liquid. There is no better lawn manure than soot. It should be sprinkled on when a shower is threatening, just enough being given to give the grass a black coating. Soot water is a first rate stimulant for many plants, imparting, as it does, a deep, glossy green hue to the foliage (*see* LIQUID MANURE). Soot and cow manure mixed, in liquid form, is a capital stimulant for Ferns and Palms.

As an insectifuge, dusted over young seedlings, it will also help to keep slugs at bay, as they do not like the acrid taste. It is useful for dusting over Gooseberry bushes that are attacked by maggot, and over young Turnips as a deterrent of the Turnip fly.

The following mixture, made up into a thick paint, is sometimes put on walls of glasshouses as a cure for Red Spider: 1 lb. flowers of sulphur, 2 oz. soft soap, and enough clay and clear soot water to bring it to the consistency above referred to. This is also a useful mixture for painting fruit walls with after the trees have been undone in the autumn, as it is effective against other insect pests than Red Spider.

In all cases soot should be kept dry and under cover. Also it should not be used fresh, but be allowed to stand for three months before it is used upon tender seedlings.

SOPHORA. (EDWARDSIA.)

A genus of stove, greenhouse, or hardy deciduous trees, shrubs, or herbs (*ord.* Leguminosæ), with heads of pretty flowers. The hardiest is japonica, the Pagoda Tree of China and Japan, but tetraptera is hardy in the south or against a wall in the warmer districts farther north. Propagation, by seeds under glass; the weeping and variegated forms by grafting on the type. Soil, sandy loam.

Principal Species and Varieties :—

japonica, 30′ to 40′, Aug., hdy., wh. (*syn.* Styphnolobium japonicum; *see p.* 346).
— hybrida, branches spreading.
— pendula, pretty weeping habit.
— variegata, lvs. variegated.
tetraptera, 6′ to 12′, My., yel.
— grandiflora, flowers longer but narrower (*syn.* tetraptera of *Botanical Magazine* 167).
— microphylla, flowers broader, branches slender (*syns.* Edwardsia macnabiana and E. macrophylla). New Zealand Laburnum.

Other Species :—

australis (*see* Baptisia australis).
bifolia (now Ammodendron Sieversii).
chrysophylla, 6′ to 10′, My., grh. shr., yel. (*syn.* Edwardsia chrysophylla).
glauca, 4′ to 6′, My., hlf-hdy. shr., pale pur. (*syn.* velutina).
heptaphylla, 6′, Oct., hdy. shr., yel.
macrocarpa of Loddiges, 8′ to 10′, Ap., grh. ev., yel. (*syn.* Edwardsia chilensis).
platycarpa, like japonica, but with flatter pods.
secundiflora, 6′, Je., grh. ev., vio.
tomentosa, 6′, Aug., hlf-hdy. shr., yel.

SOPHRO-CATTLEYA.

A number of handsome bigeneric hybrids have been raised between Sophronitis grandiflora and several species of Cattleyas. The effect of the Sophronitis parentage has been to impart a good deal of orange scarlet to the flowers and keep the hybrids dwarf. (For culture, *see* CATTLEYA.)

Principal Hybrids :—

[NOTE.—s. = sepals, p. = petals, l. = lip.]

batemanniana (S. grandiflora × C. intermedia), 3″ across, s. and p. bright ro., flushed sc., l. crim. pur., creamy wh.
Calypso (S. grandiflora × C. Loddigesii harrisoniana), 4″ across, s. and p. bright rosy pur., l. yel., pur. apex.
Chamberlainii triumphans (S. grandiflora × C. harrisoniana), s. and p. rosy pur., l. yel. disc.
hardyana (S. grandiflora × C. Aclandiæ), s. and p. light reddish pur., spotted darker, l. pur., yel. disc.
eximia (S. grandiflora × C. bowringiana), s. and p. bright pur. ro., l. dark pur., ro., throat yel.
Queen-Empress (S. grandiflora × C. Mossiæ), s. and p. rosy crim., l. dark rosy pur.

SOPHRO-LÆLIA.

Bigeneric hybrids obtained by crossing Sophronitis grandiflora with some species of Lælia. (For culture, *see* LÆLIA.)

Principal Hybrids :—

[NOTE.—s. = sepals, p. = petals, l. = lip.]

Læta (S. grandiflora × L. pumila dayana), s. and p. light red, pk., l. rosy pur., throat yel.
Marriottii (S. grandiflora × L. flava), s. and p. or., yel., l. long, narrow, yel., flushed red, or.

SOPHRO-LÆLIO-CATTLEYA.

Trigeneric hybrids resulting from the fusion of species of Sophronitis, Lælia, and Cattleya. This has been effected by crossing Sophronitis grandiflora with a Lælio-Cattleya. (For culture, *see* CATTLEYA and LÆLIA.)

Principal Hybrids :—

[NOTE.—s. = sepals, p. = petals, l. = lip.]

Eros (S. grandiflora × L.-C. elegans Turneri), beautifully coloured, and an improvement on Veitchii.
Veitchii (S. grandiflora × L.-C. schilleriana), s. and p. soft rosy car., l. deeper, flushed magenta, throat flushed yel.

SOPHRONITIS.

A small genus of cool house, epiphytic Orchids (*ord.* Orchidaceæ). Propagation, by division. Soil, peat, sphagnum, and charcoal, with good drainage. Blocks, rafts, or shallow pans may be used, but no drying-off may be attempted.

Principal Species and Varieties :—

cernua, 3″, win., rosy red, yellowish centre (*syn.* pterocarpa).
grandiflora, win., bright sc. (*syns.* coccinea and Cattleya coccinea).
— purpurea, pur.
— rosea, rosy car. ; rare.
— rossiteriana, yel., rare.
militaris, 6″, Dec., deep crim., yel. lip., streaked bright red (*syn.* grandiflora of *Botanical Magazine* 3709).
violacea, 3″, win., vio.

SOPUBIA (*syns.* GERARDIA and RAPHIDOPHYLLUM).

A small genus of erect-growing stove herbs (*ord.* Scrophularineæ), usually annuals. Propagation, by cuttings and seeds. Soil, peat two parts, loam one part, with sand.

Principal Species :—

delphiniifolia, 3′ to 4′, Jy., ro. (*syn.* Gerardia delphinifolia).

SORBUS (*see* PYRUS).

SORGHUM. (MILLET.)

Twelve species of half-hardy or greenhouse annual or perennial Grasses (*ord.* Graminæ), few of which are of importance in British gardens. Vulgare is the Indian Millet, so valuable in hotter climates for its uses as a food, but not suitable for cultivation in the open in Great Britain and Ireland. Halepense is, however, an ornamental, hardy species, and is increased by division or seeds, which grow in common soil.

Principal Species :—

halepense, 2′ to 10′, sum., pur., lvs. broad, wh. midrib. Aleppan Millet Grass.

SORINDEIA.

Stove trees (*ord.* Anacardiaceæ) of no great value. Madagascariensis, 10′, May, purple, probably the only species introduced, is an interesting tree which carries its edible, acid fruits in huge bunches upon the main stem as well as upon the branches. Propagation, by cuttings of the ripened shoots, with all the leaves intact, in sandy soil, in heat. Soil, loam two parts, leaf soil one part, and sand.

SOROCEPHALUS.

About ten species of greenhouse, leafy shrubs (*ord.* Proteaceæ). The flowers are in dense heads. Few of the species are grown, but they answer to the same treatment as the Proteas, which *see*.

Principal Species :—

diversifolius, 2′ to 6′, Je., pur.
imbricatus, 3′, Je., lil. (*syn.* Protea imbricata).
lanatus, 2′, Aug., pur.
setaceus, 2′, Je., pur.

SORREL. (RUMEX.)

For the use of their leaves as a substitute for Spinach, and in salads and other kitchen purposes, some of the species of Rumex (which *see*) are grown in gardens under the name of Sorrel. That usually grown is R. Acetosa, a native hardy perennial plant. The French Sorrel, R. scutatus, has more acid leaves. Propagation, by seeds, sown in spring or autumn, in drills, or by division of the roots in spring. Thin out the seedlings to about 1′ apart. Soil, deep, rather moist loam.

Sophronia (*of Lindley, see Sophronitis*).
Soromanes (*see Acrostichum*).
Sorrel Tree (*Oxydendron arboreum*).

SOWERBÆA.

Three species of greenhouse perennials (*ord.* Liliaceæ), of tufted habit. Propagation, by division. Soil, sandy loam and peat in equal parts.

Principal Species :—

juncea, 1′ to 2′, My., pk., umbels many flowered.
laxiflora, 1′ to 2′, Je., pk., umbels loose.

SOWING.

Though one of the most important of gardening operations, sowing is often performed in a very careless and haphazard fashion, with the consequence that failures to germinate frequently occur, for which the innocent seedsman is blamed. In outdoor sowing, in particular, much depends on its being done at the proper time, and in this there is a surprising difference in localities, some requiring much later sowing than others. The condition of the soil is another most important factor. It should neither be dust dry nor, on the other hand, so wet as to form a sticky mass when pressed. It ought to be well prepared, with a fine tilth on the surface and within reach of the rootlets. With this object leaf mould and sand are largely used in preparing seed beds for small seeds.

The depth at which to sow seeds depends upon their size, but small seeds ought to be only slightly covered with fine soil. Peas and Beans will do with 3″ or 4″ over them, but seeds about the size of the Turnip should have ½″. It is often necessary to shade the seed beds from strong sun when in the open, and all seeds sown under glass ought to have shade. Some cover the pots with glass or brown paper until the seedlings appear.

Sowing in drills possesses many advantages over broadcast sowing, and it is in most cases to be recommended. For the greater number of things thin sowing is also necessary, and carelessness with this is the cause of many failures.

Many seeds sown under glass germinate better if plunged in a little bottom heat, some, of course, requiring more than others.

For seeds in pots, finely pulverised leaf mould or peat, with about a third of sand or very sandy loam, will answer well. A little thoroughly well-decayed manure is beneficial, though not necessary. After sowing, the surface soil ought to be pressed down slightly.

SPADE.

There is little variation in the make of spades, and what there is chiefly centres in the attachment of the handle to the blade. The "socket"

Sorrowful Tree (*Nyctanthes Arbor-tristis*).
Souari Nut Tree (*Caryocar nuciferum*).
Soulangia (*see Phylica*).
Sour Gourd (*Adansonia digitata*).
Sour Sop (*see Anona*).
South African Yellow Wood (*Podocarpus elongata*).
Southern Wood (*Artemisia Abrotanum*).
South Sea Tea (*Ilex Cassine*).
Southwellia (*see Sterculia*).
Sowbread (*see Cyclamen*).
Soy (*see Glycine*).

handle costs a little more than the plain "splice" form, in which the wood runs right down to the "tread" of the blade, but in durability there is little to choose between the two. A good spade must be stout at the "collar," for it is here that the greatest strain is felt, and any weakness will soon make itself manifest in a "sprung" blade, especially when heavy soil is being manipulated. For ordinary purposes, a medium size—No. 3—is to be preferred to either a large or small one, and such a tool may be made to do duty upon heavy and light ground alike. For draining purposes spades with thick, long, and narrow blades are made, and, like the ordinary digging spades, they can be had in several sizes. The D shaped handle is the one generally favoured.

When not in use the steel parts should be wiped with an oily rag, for a rusty spade is not only untidy in appearance, but it does not work nearly so well as one with a bright blade.

SPARAXIS.

An ornamental genus of hardy or half-hardy, bulbous plants (*ord.* Irideæ), resembling the Ixia in general appearance. They make charming beds in the open, and are most attractive pot plants. Propagation, by offsets, removed when the bulbs are at rest, or by seeds sown in a frame in spring. Soil, in the open, rich, light loam, slightly above the general level; in pots, loam and leaf mould, with plenty of silver sand. For outdoor culture, plant from October to January, though some prefer February, 3″ to 4″ deep and 3″ apart. Cover with some dry litter, and add a mat if the foliage appears before frost has passed away. For pots, plant from September to December, five or six in a 5″ pot, plunge the pots in a cold frame, giving air in good weather until leaves appear, when the pots can be removed, as wanted, to the greenhouse.

Only Species and Varieties :—

[NOTE.—The nomenclature is that of Mr. J. G. Baker.]

bulbifera, 1′ to 2′, My., yel. (*syn.* Ixia bulbifera).
grandiflora, 1′ to 2′, Ap., pur., wh., or variegated (*syns.* Ixia aristata and I. grandiflora).
— Liliago, wh.
— lineata, yel., red, pk. (*syn.* lineata).
— stellaris, pur. (*syn.* stellaris).
pendula (*see* Dierama pendula).
pulcherrima (*see* Dierama pulcherrima).
tricolor, 1′ to 2′, My., or. yel., blk. (*syn.* Ixia tricolor).
— blanda, wh., ro. (*syn.* S. t. subroseo-albida).
— Griffinii, pur., blk., yel. (*syn.* tricolor violaceo-purpurea).
— versicolor, pur., blk., yel. (*syn.* versicolor).

Selection of Garden Varieties :—

[NOTE.—"Mixed" varieties can be had of capital quality.]

Angelique, wh.
Fire King, sc., blk.
Garibaldi, crim.
Lady Carey, whitish pur.
maculata, wh., pur., yel.
Queen Victoria, wh., yel., blk.

Spadostyles (*see Pultenæa*).
Spendoncea (*see Cadia*).
Spanish Bluebell (*see Scilla hispanica*).
Spanish Broom (*see Spartium junceum*).
Spanish Chestnut (*see Castanea*).
Spanish Iris (*see Iris Xiphium*).
Spanish Juice Plant (*Glycyrrhiza glabra*).
Spanish Moss (*Tillandsia usneoides*).
Spanish Oyster (*see Scolymus hispanicus*).
Spanish Squill (*see Scilla hispanica*).

SPARGANIUM. (BUR REED.)

A few species of aquatic and sub-aquatic herbs (*ord.* Typhaceæ), several being natives of Britain, but none of any horticultural merit. The stems of the Bede Sedge, ramosum, have been used for making a sort of pepper.

SPARMANNIA.

Greenhouse shrubs or trees (*ord.* Tiliaceæ), of which only one or two are in cultivation, the undernamed being of considerable beauty with their conspicuous flowers. Propagation, by cuttings in April, in sand, in heat, under a bell-glass. Soil, loam with a little peat.

Principal Species and Variety :—

africana, 10′ to 20′, My., wh. (*syn.* acerifolia).
— flore pleno, double flowers.
palmata, 4′, win., wh.

SPARTIUM. (SPANISH OR RUSH BROOM.)

Hardy, half-hardy, or greenhouse shrubs (*ord.* Leguminosæ), with Rush-like branches, frequently without leaves. Junceum, the only one introduced, is a pretty, hardy shrub, suitable for the shrubbery or rock garden. Propagation, by seeds, or by cuttings of young growths under a hand-light. Seeds are recommended. Common soil, not too wet.

Principal Species and Variety :—

junceum, 6′ to 10′, Jy., yel. (many *syns.*, acutifolium being the most common).
— flore pleno, double flowers.

SPARTOTHAMNUS.

Cool greenhouse shrubs (*ord.* Verbenaceæ), with pretty, small flowers, and slender branches resembling those of the Broom. Propagation, by cuttings, under a glass, in sand. Soil, loam and sandy peat

Only Species :—

junceus, 2′, Aug., wh.

SPATALLA.

Heath-like shrubs (*ord.* Proteaceæ) of little decorative value. (For cultural details, *see* PROTEA.) The flowers are very small.

Principal Species :—

curvifolia, 2′, Ap., grh.
mollis, 2′, Je., grh.
nivea, 2′, Je., grh.
parilis, 3′, Je., yel., grh.
procera, 2′, My., grh.
prolifera, 2′, Jy., grh.

SPATHANTHEUM.

The principal species, orbignyanum (*syns.* heterandrum and Gamochlamys heterandrum), green (*ord.* Aroideæ) is a tuberous-rooted perennial from Africa. Propagation, by division, just before fresh growth starts. Soil, loam two parts, peat one part. Free drainage, and liberal supplies of water.

SPATHELIA.

A small genus of stove evergreen trees (*ord.* Simarubeæ), of stately presence, and with huge, showy heads of flowers Propagation, by cuttings of the ripened shoots, in sand, in a close, warm frame. Soil, loam and peat, both fibrous, in equal parts, with sand.

Principal Species :—

simplex, 20′ to 50′, Ap., st., red, lvs. pinnate. Maypole, Mountain Green and Mountain Pride of the West Indies.

Spanish Viper's Grass (*see Scorzonera*).
Spatalanthus (*see Romulea*).

SPATHICARPA.

Stove, evergreen, tuberous-rooted herbs (*ord.* Aroideæ). Propagation, by division and by seeds. Soil, good, sandy loam.

Principal Species and Varieties :—

hastifolia, 1′, grn., lvs. tripartite.
sagittifolia, 6″ to 12″, grn , lvs. arrow-head shape (*syns.* longicuspis and platyspatha).

SPATHIPHYLLUM.

Stove, evergreen, perennial herbs (*ord.* Aroideæ). Some of the smaller-growing species, such as candidum and Patinii, make excellent companion plants for Anthurium andreanum and A. scherzerianum. Propagation, by division, preferably in spring; occasionally by seeds. Soil, leaf mould and peat two parts each, fibrous loam one part, with a little sand and a few pieces of charcoal. Free drainage. A moist atmosphere, and liberal supplies of water, must be given in summer.

Principal Species :—

[NOTE.—s. = spathe, sp. = spadix.]

candidum, 9″, s. wh., sp. wh., slender, lvs. lanceolate (*syn.* Anthurium candidum).
cannæfolium, 1′, s. wh., sp. wh., 5″ long, 3″ broad, lvs. ovate or oblong (*syns.* cannæforme, Anthurium Dechardii, and Pothos cannæfolia).
Patinii, 9″, s. wh., with a grn. midrib, sp. wh., lvs. lance shaped, close to candidum (*syns.* Amomophyllum and Anthurium Patinii).
pictum, lvs. 1½′ long, blotched golden grn.

Other Species, Hybrid, and Varieties :—

cochlearispathum, 4′, s. grn., 1′ long, sp. wh. (*syn.* heliconiæfolium).
commutatum, 2½′, s. wh., sp. wh., short lvs. oblong.
floribundum, 1′, s. wh., sp. wh., long lvs. oblong (*syn.* Anthurium floribundum).
hybridum (cannæfolium × Patinii), sp. large, wh.
Ortgiesii, 1½′, s. bright grn., lvs. elliptic.
Wallisii (now Stenospermation Wallisii).

SPATHODEA.

A fairly large genus (*ord.* Bignoniaceæ), of which the principal species, campanulata, is a handsome stove evergreen tree, thriving under the same treatment as the stove Bignonias, which *see*.

Principal Species :—

campanulata, 50′, 2½″ to 3″ across, Je., st., or., lvs. large, pinnate.
lævis (now Newbouldia lævis).
speciosa, 40′, sum., pk.

SPATHOGLOTTIS.

Stove terrestrial Orchids (*ord.* Orchidaceæ), with corm-like pseudo-bulbs and Grass-like foliage. Propagation, by division. Soil, leaf mould or fibrous loam, with a little sand or peat and chopped sphagnum. Free drainage, and liberal supplies of water in the growing season.

Principal Species :—

[NOTE.—s. = sepals, p. = petals, l. = lip.]

aurea, 3″ across, aut., yel., spotted red, very showy.
Fortunei, 9″ to 10″, 1″ to 1½″ across, aut., cool house, yel., l. spotted red.
kimballiana, lvs. 2′ to 3′, 3″ across, sum., bright yel., s. copper, l. spotted red.
Lobbii, lvs. 12″ to 15″, 1½″ across, aut., sulphur yel., s. and l. spotted brownish red.
Petri, lvs. 12″ to 18″ long, 1″ across, sum., pale rosy lil.
Vieillardii, lvs. 2′ to 3½′, 2″ across, aut., s. and p. wh., flushed ro., l. ro., wh. (*syn.* Augustorum).

Other Species and Varieties :—

angustifolia (*see* plicata).
Augustorum (*see* Vieillardii).
gracilis, lvs. 2′, win., golden yel., 2″ across, l. spotted red.
ixioides, lvs. 8″ to 18″ long, sum., yel., ¾″ to 1¼″ across.
lilacina (*see* plicata).
plicata, lvs. 2′ to 3′ high, sum., s. and p. rosy pur., 1″ to 2″ across (*syns.* lilacina and spicata).
— alba, pretty wh.
— Micholtzii, sum., larger.
pubescens, Je., dull yel, flushed vio.
spicata (*see* plicata).

SPAWN.

The vegetative portion (mycelium) of Mushrooms. These white threads (hyphæ) are to be seen growing on decaying animal matter, horse droppings, etc. (For the artificial production of spawn, *see* MUSHROOMS.) If kept nearly or quite dry this mycelium has remarkable vitality, and will often grow after lying dormant for several years. The bulbils developed from old corms of Gladioli are spoken of as "spawn." As these are too small to plant separately, they are "sown" in pans or drills of prepared soil in the same way as seed.

SPECULARIA. (VENUS' LOOKING-GLASS.)

Pretty, small-flowered, generally hardy, annual herbs (*ord.* Campanulaceæ), best known in gardens by the neat little annual Speculum (*syn.* Campanula Speculum), sometimes used in the borders or in beds. Propagation, by seeds. Common soil.

Principal Species :—

biflora, 1′, Je., hdy. ann., bl. (*syn.* californica).
falcata, 6″, Jy., hdy. ann., ro.; castellana is a var.
hybrida, 6″ to 12″, Jy., hdy. ann., bl. and lil. (*syn.* Campanula hybrida).
pentagonia, 1′, Jy., hdy. ann., bl. (*syn.* Campanula pentagonia.)
perfoliata, 4″ to 18″, Je., hdy. ann., purplish bl.
Speculum, 1′, Jy., hdy. ann., pur (*syns.* arvensis, cordata, hirsuta, hirta, and Campanula Speculum). There are varieties in various colours from wh. to bl., in single and double forms.

SPEIRANTHA.

A half-hardy or greenhouse herb (*ord* Liliaceæ) with rosettes of leaves and a spike of from twenty to thirty flowers like those of an Albuca, to which it is allied. Propagation, by seeds or division. Soil, sandy loam.

Only Species :—

convallarioides, 6″, Je., wh. or grn. (*syn.* Albuca Gardeni).

SPERGULA.

Hardy annual herbs (*ord.* Caryophylleæ), sometimes used as an edging instead of Grass. The plant generally grown as Spergula pilifera, and useful for the above purpose or for carpeting taller plants, is properly Sagina subulata (*see* SAGINA), sometimes named Sagina pilifera or S. glabra. The yellow-leaved form of this is desirable. The Spergulas are generally white flowered, but as a rule so worthless in the garden as not to require naming here.

SPERMACOCE. (BUTTON WEED.)

Stove, greenhouse, or hardy annual or perennial herbs or sub-shrubs (*ord.* Rubiaceæ). None is of any value to the gardener. Strigosa of *Botanical Magazine* 1558 is Crusea rubra.

Speedwell (*see Veronica*).
Spennera (*see Aciotis*).
Spergulastrum (*see Stellaria*).

SPHACELE.

Warm greenhouse shrubs or sub-shrubs (*ord.* Labiatæ), nearly allied to the Horminums, and doing well with the treatment recommended for the warm greenhouse Salvias (which *see*).

Principal Species :—

cœrulea (of gardens), win., pale bl.
campanulata, 2′ to 3′, Jy., shr., pale bl.
Lindleyi, 3′ to 4′, Jy., shr., purplish vio.

SPHÆRALCEA.

Hardy, greenhouse, or stove plants (*ord.* Malvaceæ), resembling the Malvas. Propagation, by seeds, or cuttings of the young growths in sand under a bell-glass. Soil, well-drained loam.

Principal Species :—

abutiloides, 4′, Aug., grh. shr., ro. (*syn.* Malva abutiloides).
acerifolia, 2′ to 6′, sum., hdy., per., wh. or pk. (*syn.* rivularis).
elegans, 2′, Jy., grh. sub-shr., pale pk., pur. veins.
Emoryi, 1′ to 2′, sum., hdy. per., or. red.
munroana, 2′, Aug., hdy. per., sc. (*syns.* Malva munroana and Malvastrum munroanum).

Other Species :—

angustifolia, 3′ to 4′, Aug., grh. shr., pk. (*syn.* Malva angustifolia).
nutans, 2′, Jy., st. shr., reddish pur.
obtusiloba, 3′, Jy., grh. shr., pur. (*syn.* Malva obtusiloba).
umbellata, 10′, spr., st. shr., rosy vio. (*syn.* Malva umbellata).

SPHÆROLOBIUM.

Greenhouse, evergreen shrubs (*ord.* Leguminosæ) with Rush-like, usually leafless, stems. Propagation, by cuttings of the young shoots, in sand, under a bell-glass, with heat. Soil, loam and peat in equal parts, with sand.

Principal Species :—

grandiflorum, 1′ to 3′, sum., yel., red, usually in pairs, an elegant plant.
medium, 1′ to 2′, sum., red or or., numerous, in terminal racemes (*syn.* acuminatum).
vimineum, 6″ to 24″, sum., yel., in racemes.

SPHÆROPHYSA.

A few species (*ord.* Leguminosæ) of hardy perennial herbs or sub-shrubs, with red flowers and inflated pods. Propagation, by seeds, which occasionally ripen in this country. Soil, sandy loam. Slightly salt water is an excellent stimulant.

Principal Species :—

salsula, 1½′, Jy., Aug., pale pur. (*syn.* caspica).

SPHÆROPTERIS.

A rather uncommon Fern (*ord.* Filices), of no special garden value. Propagation, by spores. Soil, equal parts of fibrous loam and leaf soil or peat with sand.

Only Species :—

barbata, fronds 2′ to 3′ long, tripinnate, st. (*syn.* Peranema cyatheoides).

SPHÆROTHECA.

A troublesome genus of mildews (*ord.* Erysipheæ), whose members attack several garden plants. The most important are Castagnei and Humuli, which attack Strawberries ; Mors-uvæ, which preys upon Gooseberries ; and pannosa, which infests Roses. Remedial measures are given under MILDEWS, and under the various plants attacked.

Sphærogyne (*see Tococa*).
Sphærostema (*see Schizandra*).
Sphærostigma (*see Œnothera*).

SPHAGNUM.

A very distinct genus of Mosses, of which about seventeen species and many varieties are British. The stems are capable of almost indefinite extension, the lower parts dying away as growth proceeds. Owing to its peculiar structure, Sphagnum has the power of absorbing immense quantities of water, acting as a vegetable sponge. The plants reproduce themselves naturally by spores and by the establishment of branches, which ultimately become main stems after their severance from the parent. Naturally the Sphagnums are to be found in swampy and boggy spots.

In collecting Sphagnum only the live tips should be taken. The moss will retain its vitality for a long time even if packed in bales, but it will be well to undo these, spread the Moss out under the shelter of a tree or shed, and keep it sprinkled with water. Chopped Sphagnum is a principal ingredient in the compost for many Orchids. For some Ferns, notably Platyceriums, it may also be used with advantage. Tips about ½″ long are commonly inserted at intervals over the surface of the soil in a newly potted Orchid. Not infrequently these grow so rampantly that the Moss has to be reduced somewhat. The rougher portions of Sphagnum may be used for covering the drainage of almost all pot plants.

SPHENANDRA.

The only species (*ord.* Scrophularineæ) is a viscous little annual or perennial herb, increased by seeds, and thriving in a sandy loam, in the greenhouse.

Only Species :—

viscosa, 1′, Je., grh., vio. (*syn.* Buchnera viscosa of *Botanical Magazine* 217).

SPHENODESMA (*syns.* ROSCOEA of ROXBURGH, and VITICASTRUM).

A few species of stove climbing shrubs (*ord.* Verbenaceæ). Propagation, by cuttings in sand, in a warm frame. Soil, sandy loam.

Principal Species :—

pentandra, 6′, Je., st., pur., wh. throat (*syn.* jackiana).

SPHINCTACANTHUS.

A small and obscure genus (*ord.* Acanthaceæ) of no garden value.

SPIGELIA.

A genus of upwards of forty species of greenhouse or stove herbs or sub-shrubs (*ord.* Loganiaceæ), with small flowers in spikes. Few are grown in gardens, marilandica being, however, occasionally met with in Alpine collections. Propagation, by seeds, the perennials also by cuttings. Soil, loam, peat, and sand.

Sphenogyne (*see Ursinia*).
Sphenotoma (*see Dracophyllum*).
Spice Bush (*see Lindera Benzoin*).
Spider Flower (*see Cleome*).
Spider Lily, Golden (*see Lycoris*).
Spider Orchid (*see Bartholina pectinata*).
Spider Orchis (*see Ophrys*).
Spiderwort (*see Tradescantia*).
Spielmannia (*see Oftia*).

Principal Species :—

anthelmia, 1½′, Jy., st. ann., purplish wh. Demerara Pink Root.
marilandica, 6″ to 18″, Jy., hdy. per., reddish yel. Worm Grass, Indian Pink, Maryland Pink Root.
splendens, 1½′, Jy., st. per., sc.

SPILANTHES (*syn.* SPILANTHUS).

A genus of about forty species of annual or perennial herbs (*ord.* Compositæ) of no garden value in this country, though acmella (*syn.* oleracea) is used as a salad in the tropics. The species have yellow or white flowers with a yellow disc.

SPINACH.

This vegetable (Spinacia oleracea, *ord.* Chenopodiaceæ) is in high favour in many gardens, its flavour being quite distinct from that of any other green vegetable. A rather deep, moderately rich, and well cultivated soil is necessary if good crops are to be obtained, and this is especially important in the case of the Prickly or Winter Spinach. Seed of this should be sown at any time from the middle of August until the beginning of September. Sowings may be made as late as the middle of September, but the earlier sowings are to be recommended, as the plants have a much better chance to become well established before winter sets in. Drills 15″ apart are best, but closer sowings can be made where the ground is poor and hungry. A partial thinning of the young plants may be given as they begin to crowd each other, but in no case must the thinning be severe. A hard winter and close picking often cause gaps if the first thinning has been close. Little attention is needed beyond an occasional hoeing to keep down weeds. As a rule, it is not necessary to pick from beds of winter Spinach until the autumn has well advanced, but if care is exercised in the gathering of the leaves, a moderate sized bed will give continuous supplies through the winter and until late in the spring, when the plants begin to run to seed, and the Summer Spinach comes in. The whole crop may then be dug into the ground, as it forms an excellent green manure on most soils.

The Round or Summer Spinach may be treated as a catch crop, rows being worked in between rows of Peas and Beans. From the first sowing towards the end of February until nearly the end of July sowings should be made fortnightly to keep up the succession, as Summer Spinach speedily runs to seed. The drills need not be more than 1′ apart. Frequent hoeings, with an occasional watering in droughty spells, are matters of routine. (For species and varieties, *see* SPINACIA.)

Peronospora effusa is the only fungus that gives much trouble; the plants attacked should be burned. A few Potherb moths, Noctuæ, and surface caterpillars sometimes work harm, but not to any serious extent.

Photo: Cassell & Company, Ltd.

SPIRÆA CANESCENS (*see p.* 353).

SPINACIA.

Of the four species (*ord.* Chenopodiaceæ) only one, oleracea, the Spinach, is of moment. For cultural details, *see* SPINACH.

Principal Species and its Varieties :—

oleracea, 2′, Je., hdy., grn., lvs. large and succulent.
— glabra. Round or Summer Spinach.
— spinosa. Prickly or Winter Spinach.

SPIRÆA. (MEADOW SWEET.)

Description.—Although the genus Spiræa (*ord.* Rosaceæ) is not one of the most numerous, it is one of the really valuable genera for the garden. It comprises many plants of the highest types of beauty for the garden, shrubbery, window, or greenhouse. The greater number of the species are hardy perennials of herbaceous, sub-shrubby,

Spikenard (*see Nardostachys*).
Spikenard, Ploughman's (*see Baccharis*).

Spinach, Mountain (*see Atriplex hortensis*).
Spinach, Wild (*see Chenopodium Bonus-Henricus*).
Spindle Tree (*see Euonymus*).
Spinovitis (*see Vitis*).

or shrubby habit. Unfortunately the synonymy is very obscure. (*See also* ASTILBE and NEILLIA).

Propagation.—By division in the greater number of cases, by seeds, and the shrubby species by cuttings of the young wood struck under a hand-light, or by the rooted suckers.

Soil.—Many, especially the herbaceous plants, prefer a moist soil and thrive splendidly by the water side. The shrubs grow in any good loam.

In Pots.—Many of the Spiræas do well in pots if grown in a similar way to Astilbe (Spiræa of gardens) japonica, and several force well. For this the earlier shrubby species are very suitable and make pretty ornaments for the conservatory.

Shrubby Spiræas.—The requirements of these fine shrubs are as varied as their character, but all will thrive in a good loam. The greater number of the vigorous growing species, such as salicifolia, like plenty of moisture, and will do well by the side of a stream or pond; while others, such as bullata and canescens, are good plants for rockeries or banks of stiff soil. In pruning, the habits of the different species should be studied. Japonica, Douglasi, salicifolia, and other quick-growing species which flower on the current season's wood, should be well thinned in spring, and the shoots should be cut back well to encourage strong branches, from which the best inflorescences are borne. Arguta, Thunbergi, and others of the spring-flowering set require thinning after flowering, but no shortening is required. Prunifolia flore pleno is improved by thinning, and the removal of old flowering wood as soon as the flowers fade. Several other species, such as discolor, merely require the removal of dead wood, severe pruning being detrimental.

Principal Species, Hybrids, and Varieties:—

Aitchisoni, 6′ to 8′, Aug., Sep., hdy. shr., yel.
arguta, 3′, sum., hdy. shr., wh., hybrid (*syn.* multiflora alba).
ariæfolia (*see* discolor var.).
Aruncus, 4′ to 6′, Je., hdy. per., wh.; several vars.
astilboides, 2′, Je., hdy. per., wh.; a popular pot plant (*syns.* Astilbe astilboides and A. spiræoides, referred to S. Aruncus by *Index Kewensis*).
— floribunda, a superior variety.
— Lemoinei, a pretty hybrid.
bella, 2′ to 3′, Jy., hdy. shr., red (*syns.* amœna and ovata).
camtschatica, 4′ to 10′, Je., hdy. per., wh. (*syn.* gigantea).
— hybrida or "Edge Hall," pk.
discolor, 4′ to 10′, sum., hdy. shr., dull wh. (*see p.* 354).
— ariæfolia, 8′, Je., wh.
— dumosa, dwarfer (*syns.* dumosa and Boursieri).
Douglasi, 3′ to 9′, Aug., hdy. shr., ro. (*syns.* tomentosa argentea and Menziesii).
Filipendula, 1½′ to 3′, Je., hdy. per., wh. Dropwort.
— flore pleno, double flowers.
japonica, 2′ to 6′, Je., hdy. ev. shr., ro. (*syns.* callosa, bellioides, and Fortunei).
— alba, wh. (*syns.* albiflora, callosa flore-albo, and lanceolata of gardens, not Poir).
— Anthony Waterer, crim.
— Bumalda, crim. (*syn.* Bumalda).
— superba, crim. (*syn.* callosa superba).
— glabrata and ruberrima are other vars.
japonica of gardens (*see* Astilbe japonica).
lindleyana, 4′ to 8′, Aug., hdy. shr., wh. (*see p.* 355).
media, 2′ to 4′, Je., hdy. shr., wh. (*syns.* confusa and oblongifolia).
palmata, 1′ to 2′, Je., hdy. per., crim.
— alba, wh.
— elegans (of gardens), wh., red; possibly a var. of Ulmaria.
— purpurea, lvs. pur.

Photo: D. S. Fish, Edinburgh.

SPIRÆA CANTONIENSIS.

prunifolia, 3′, spr., hdy. shr., wh.
— flore pleno, double.
Thunbergi, 1′ to 3′, spr., hdy. shr., wh. (*syn.* Thompsoni).
Ulmaria, 2′ to 4′, Je., hdy. per., wh. Queen of the Meadow, Meadow Sweet.
— aureo-variegata, foliage variegated.
— flore pleno, a pretty double form.

Other Species and Varieties:—

amurensis (now Neillia amurensis.)
arbuscula, dwarf shr., ro.
betulifolia, 1′ to 2′, Je., hdy. shr., wh. (*syns.* chamædrifolia var. betulifolia and splendens).
— corymbosa, more numerous flowers (*syns.* corymbosa, chamædrifolia var. corymbosa, and arctica).
Blumei, 3′ to 6′, sum., hdy. shr., wh. (*syns.* chamædrifolia of Blume, not Linnæus, and rupestris).
bracteata, 2′ to 3′, Je., hdy. shr., wh. (*syns.* media var. rotundifolia, nipponica, and rotundifolia alba).
bullata, 1′ to 1½′, sum., hdy. shr., pk. (*syn.* crispifolia).
cæspitosa, 6″, sum., hdy. shr., wh.
callosa, of Thunberg is japonica; of Wallich, Cat. N. 707, is bella.
cana, 1′ to 2′, Je., hdy. shr., wh. (*syns.* hypericifolia and regeliana of gardens, not Koch).
canescens, 4′, sum., hdy. shr., pk. or wh. (many *syns.*, flagelliformis, flagellaris, and hypericifolia crenata, etc.; *see p.* 352).
— myrtifolia, Myrtle leaved.
cantoniensis, 3′ to 4′, sum., hdy. ev. shr., wh. (*syns.* reevesiana, corymbosa, japonica of Sieb., and lanceolata; *see* figure).
— flore pleno, double flowers.
chamædrifolia, 1′ to 2′, Jy., hdy. shr., wh. (*syns.* ceanothifolia and ulmifolia of Scop.).
— flexuosa, smaller flowers.
chinensis (*see* dasyantha).
crenata, sum., hdy. shr., wh.
dasyantha, 2′, Mch., wh. (*syns* chinensis of Maxim, and pubescens of Lindley).
decumbens, trailer, sum., hdy. shr., wh. (*syn.* procumbens).
digitata, 2′, Jy., hdy. per., red, referred to palmata by *Index Kewensis*.
expansa (*see* bella).
Foxii, referred by *Index*

Photo: Cassell & Company, Ltd.

SPIRÆA DISCOLOR (*see p.* 353).

Kewensis to japonica and by *Kew Hand-List* to sorbifolia.
gracilis, 2′, Jy., hdy. shr., wh. (*syn.* vacciniifolia of Lodd., not Don).
Humboldtii, sum., hdy. per., wh.
hypericifolia, 4′ to 6′, Jy., hdy. shr., wh. (*syn.* thalictroides).
lævigata, 2′ to 3′, Je., hdy. shr., wh.
lobata, 2′, Je., hdy. per., pk. Queen of the Prairie.
Margaritæ, pk., hybrid ?.
Millefolium, 2′, sum., hdy. ev. sh., wh. (*syn.* Chamæbatiaria Millefolium).
opulifolia (*see* Neillia opulifolia).
pectinata, 6″ to 15″, sum., hdy. per., wh.
pikoviensis (*syn.* Nicoudierti), hybrid (crenata × hypericifolia).
pubescens, 2′, Meh., hdy. shr., wh. (*syn.* chinensis of gardens.)
salicifolia, 3′ to 5′, Jy., hdy. shr., ro. or pk.
— Billardi, Je., etc., red.
— floribus albis, wh.
— floribus roseis, flesh coloured.
— grandiflora, large flowers, pk.
— paniculata, wh. (*syns.* alba, Douglasi latifolia, latifolia, and montana).
— minor, dwarfer, smaller flowers.
Schinabecki, hybrid (chamædrifolia × trilobata).
sorbifolia, 3′ to 6′, Jy., hdy. shr., wh. (*syns.* floribunda, Foxii, Pallasi, and pinnata).
tomentosa, 3′, Jy., hdy. shr., ro. or wh.
trilobata, 1′ to 2′, My., hdy. shr., wh. (*syns.* crenata sublobata, hypericifolia trilobata, rupestris of gardens, not Siebold, and thalictroides of gardens, not Linnæus).
vacciniifolia, 1′ to 2′, Jy., hdy. shr., wh. (Don, not Lodd., *syns.* laxiflora and rhamnifolia).
Van Houttei, My., wh., often grown in gardens as confusa.
vestita, 1½′, Je., hdy. per., wh. (*syn.* cauntschatica himalensis).

SPIRANTHERA.

An ornamental, fragrant stove shrub (*ord.* Rutaceæ). Propagation, by cuttings of half-ripe shoots under a glass in sand, giving a little air occasionally to avoid damping off, and wiping the glass at the same time. Soil, sandy loam, with a little peat. Spiranthera of Hooker is Pronaya; that of Rafinesque is Eustrephus.

Only Species :—

odoratissima, 6′, Jy., wh.

SPIRANTHES. (LADY'S TRESSES.)

A large genus (*ord.* Orchidaceæ) of terrestrial Orchids, requiring outdoor, greenhouse, or stove treatment. Propagation, by division just before growth begins. Soil, for the stove and greenhouse species, fibrous peat and turfy loam, well drained, and kept on the dry side when at rest; for the hardy ones, a similar mixture, with chalk or limestone.

Principal Species and Varieties :—

æstivalis, 6″ to 12″, Jy., hdy., wh.
autumnalis, 4″ to 8″, Aug., hdy., wh.
cernua, 6″ to 18″, Sep., hdy., wh. (*syn.* Neottia cernua).
cinnabarina, 2′ to 3′, Je., grh., flesh, yel. (*syn.* Stenorrhynchus cinnabarinus).
colorata, 2′, Ap., grh. or st., sc. (*syns.* colorans, Neottia speciosa, and Stenorrhynchus speciosus).
— maculata, lvs. spotted bright grn.
— Ortgiesii, lvs. ro., blotched wh.

Other Species and Varieties :—

australis, 6″ to 12″, Je., grh., pk., wh. (*syn.* Neottia australis).
bicolor, 1′, Jan., grh., grn., wh. (Lindley, not Grisebach, *syn.* Neottia bicolor).
bracteosa, 1′, My., grh., yel., wh.
elata, 1′ to 2′, Jy., grh., grn. (*syns.* Neottia elata and N. minor).
Esmeralda, 1½′, grh., grn., wh., yel. (*syn.* margaritifera).
euphlebia, 1′ to 1½′, Nov., grh., wh., red, br.
orchioides, 2′ to 3′, Nov.,

grh., grn., yel. (*syn.* Neottia orchioides).
picta, 1′ to 2′, Feb., grh., grn., wh.
— grandiflora, flowers grn. inside (*syn.* Neottia grandiflora).
— variegata, flowers wh. inside, lvs. variegated (*syn.* Neottia acaulis).
romanzoffiana, 6″ to 10″, Aug., hdy., wh. (*syn.* gemmipara).
Sauroglossum, 2′, Ap., st., grn., wh. (*syn.* Sauroglossum elatum).
Smithii, 1′ to 2′, grh. or st., yel. or br.
Weirii, grh. or st., red.

SPIRONEMA.

A vigorous, creeping stove-herb (*ord.* Commelinaceæ). Increase is by division. Any light, rich soil.

Only Species :—

fragrans, 2′, My., st., wh., small, but fragrant.

Spire Lily (*see Galtonia candicans*).
Spleenwort (*see Asplenium*).
Splitgerbera (*see Bœhmeria*).

SPONDIAS. (Otaheite Apple, Hog Plum.)

About a dozen species of stove trees (*ord.* Anacardiaceæ), with small flowers and fleshy fruits, resembling those of the Plum. Propagation, by cuttings in heat. Soil, turfy loam and sand.

Principal Species :—

borbonica, 40′, dark pur.
dulcis, 50′, Je., yel., grn., fruit golden yel. (*syns.* acida of Blume and cytherea). Sweet Otaheite Apple.
lutea, 30′, sum., creamy wh., fruit yel. (*syn.* brasiliensis, Mombin of Jacquin, not Linnæus). Golden Apple, Jamaica Plum.
mangifera, 30′, wh. Hog Plum.
purpurea, 30′, sum., pur., fruit yel. (*syns.* Mombin of Linnæus, not Jacquin, Myrobalanus of Jacquin, not Linnæus or Velloz).

Sponge Tree (*Acacia farnesiana*).

Photo : Cassell & Company, Ltd.

Spiræa lindleyana (*see p. 353*).

SPOT.

A popular name given to several fungoid diseases attacking garden plants, and betraying their presence by white, brown, or black spots upon the leaves.

Grape Anthracnose (Glæosporium ampelophagum or Sphaceloma Ampelinum) is sometimes spoken of as Grape Spot. Grape Rot and Bird's Eye Rot are other names for it. The spots are grey, with a vermilion red ring. Leaves, shoots, and berries are all attacked. Spraying with a solution of sulphate of iron (6 lb. in 14 gallons of water) is recommended, but this must only be done when the canes are at rest. For checking the spread of the disease in the growing season, dust with equal parts of air-slaked lime and flowers of sulphur.

Orchid Spot is a common malady amongst exotic Orchids. Its spread is assisted by fluctuations of temperature and a very stagnant, moisture laden atmosphere in the houses during the late autumn and winter months.

Tomatoes are subject to the attacks of several "spots." Cladosporium fulvum is sometimes known as the Yellow Spot of Tomatoes. Black Spot (Macrosporium Tomati) is fully as troublesome and rather more widespread. (*See* TOMATO DISEASES.)

The Fairy-ring Spot of Carnations is the work of Heterosporium echinulatum. The spots are light coloured. Burning badly infested plants and spraying those lightly attacked with potassium sulphide, ½ oz. to 1 gallon of soft water, are the remedies. (*See also* CARNATIONS.)

SPRAGUEA.

A genus of two species of half-hardy perennials (*ord.* Portulaceæ), suited for small borders or rock-work. Propagation, by seeds sown in a frame, or by cuttings. Common soil.

Principal Species :—

umbellata, 6″, Jy., pur., wh.

SPRAYING.

The treatment of various fungoid and insect pests by spraying has come into favour of late years. The system has grown naturally out of the use of the syringe, but there is this difference, that whereas only a comparatively coarse spray is possible with a syringe, an almost mist-like spray is obtained from a proper sprayer.

Sulphate of copper is a common ingredient of solutions for spraying, as in the Bordeaux Mixture employed for Potatoes and Tomatoes. (*See* BORDEAUX MIXTURE.) A pure sulphate of copper solution is used to spray fields badly overrun with Charlock. The sulphate sticks to the rough leaves of the Charlock and kills the plants, whilst it does not cling to the smooth leaves of the Wheat. Strong nitrate of soda solution has been used for the same purpose. Potassium sulphide when dissolved in water, Paris Green in water, kerosene emulsion, and the soda-potash mixture for the winter dressing of fruit trees are other favourite spraying mixtures. (*See also* INSECTICIDES and FUNGICIDES.)

When there are acres of Wheat or fruit trees to spray special machines are necessary. Mr. Strawson's Strawsoniser is a large, horse-drawn machine used with a sulphate of copper solution. The Merryweather steam pumping machine, which is strong enough to keep from twelve to twenty-four sprays at work at once, is an excellent contrivance for disinfecting Hop and fruit plantations, and with the very fine spray sent out from the nozzles the insecticide or fungicide is husbanded to the utmost extent, all parts of the tree being wetted with surprisingly little expenditure of fluid.

The employment of hand-pumps for forcing the liquid through the nozzles is largely favoured, although it is rather costly from the labour point of view. Small knapsack sprayers are in use. The Auto-Spray No. 1 bids fair to become a real boon where spraying on a small scale has to be done. The fluid is contained in a reservoir with a capacity of 4 gallons, and the motive power applied by merely turning a tap at the end of the short length of hose attached to a cylinder of compressed air. The machine is charged with compressed air by a few strokes of a plunger, which is an integral part of the whole machine. In nearly all spraying it is difficult to get the liquid free from sediment. Even a little of the latter will choke up the fine jets of the spraying nozzle, and cause delay and proportionate expense. This can only be overcome by constant agitation. The Abol spraying syringe is also useful, and it is not expensive.

SPREKELIA. (JACOBEA LILY.)

A genus of greenhouse or half-hardy bulbous plants (*ord.* Amaryllideæ), cultivated in a similar manner to the Amaryllises (which *see*). They may be planted out on a south border against a greenhouse in April or May, but are most satisfactory in pots.

Only Species and Varieties :—

Cybister (now Hippeastrum Cybister).
formosissima, 2′, Je., crim. (*syn.* Amaryllis formosissima).
— glauca, lvs. glaucous, flowers smaller, paler (*syn.* glauca).
— Karwinskii, duller colour, but keeled and bordered wh.
— ringens, lvs. glaucous, upper segment marked yel.

SPRENGELIA.

Neat greenhouse shrubs (*ord.* Epacrideæ), of which only one or two are in cultivation. Propagation, by seeds or cuttings. Soil, sandy peat. (*See also* EPACRIS.)

Principal Species :—

Andersoni (now Andersonia sprengelioides).
incarnata, 2′, My., pk. (*syns.* montana and propinqua).
Ponceletia, 1′, My., sc. (*syn.* Ponceletia sprengelioides).

SPRING BEETLES. (SKIPJACKS.)

Spring Beetles (Elateridæ) are responsible for the troublesome Wireworm. If the beetles be laid on their backs on any hard surface they leap several inches into the air to gain their feet again. Directly, the beetles do very little harm, but they should be destroyed whenever seen, if only for the sake of the Wireworms which they bring into existence. (*See also* WIREWORM.)

Spoxledera (*see Ceratotheca*).

Spread Eagle (*Oncidium carthagincnse*).
Spring Bell (*see Sisyrinchium*).
Spring Grass (*see Anthoxanthum*).
Spring Snowflake (*see Leucojum vernum*).
Spring Starflower (*see Brodiæa* [*Triteleia*] *uniflora*).

SPRINGTAILS.

A popular name for some genera of insects (Collembola) whose members have the power of jumping. They are minute wingless insects, which feed upon animal and vegetable refuse, and are usually to be found in damp, shady corners of the garden. Sometimes they take possession of the Mushroom house, but in no case do they work appreciable harm.

SPRUCE GALL APHIS.

The young twigs of Spruce Firs, especially when growing in thick plantations, often suffer from the presence of a number of small galls, not unlike miniature Pineapples in appearance. In colour they may be red, yellow, or pale green, and may vary from ¾″ to 1½″ in length. When young they are fleshy, but with age the scales composing them open, and become hard and brown, in which condition they will remain upon the trees for years. These galls are the work of an aphis, Chermes Abietis (*syn.* Adelges Abietis), the immediate producers of the galls being woolly, oval, yellowish green, wingless, viviparous females. The irritation is first set up by the puncture of the insect's beak, and continued by the suction of the numerous larvæ. The larvæ pupate in the cavities of the gall, and the winged females are found in June and July; the males are small, wingless, and rare. Burning the young galls is the best remedy. Exposure of the trees to air and light is an important preventive measure, as is also the draining of damp soils. (*See also* CHERMES.)

SPURRING.

Cutting back side shoots of fruit and other trees to within two or three buds of their origin. Most fruit trees bear their fruit upon spurs, but in some cases the supply of natural spurs has to be supplemented by others artificially induced, as in the case of the Apricot or sweet Cherry. A spur is really a short shoot bearing a number of buds, and it is the aim of the fruit grower to ensure a quantity of these spurs. It is necessary to check the extension of the shoot in the summer by taking out the point, and it is frequently necessary to pinch twice, sometimes thrice, during the growing season. At the winter pruning the real cutting back is given. In wall trees that have been badly pruned for a series of years the spurs become long and straggling. In this case they may with advantage be shortened to some extent, so as to bring them within the sheltering influence of the wall.

Spurring is a favourite method of pruning many ornamental climbers, including Passifloras and Bougainvilleas, and not only is a better crop of flowers obtained by this method, but the whole of the room available is devoted to the young wood. Some thinning of the young shoots is often needed where the spurs are rather close and carrying a lot of buds.

Spruce, Douglas (*see Pseudotsuga*).
Spruce Fir (*see Picea*).
Spruce Hemlock (*see Tsuga*).
Spurge Flax (*see Daphne Mezereum*).
Spurge Laurel (*see Daphne Laureola*).
Spurge Nettle (*Jatropha urens*).
Spurge Olive (*Cneorum tricoccum and Daphne Mezereum*).
Spurgewort (*see Euphorbia*).
Spurless Violet (*Viola hederacea*).

SPYRIDIUM.

Greenhouse shrubs (*ord.* Rhamneæ), few of which are in cultivation; probably globulosum is the only one. It is of no value.

SQUASH.

This is a name given to different varieties of edible Gourds, chiefly in the United States (*see* GOURDS).

STAAVIA.

A genus of about half a dozen Heath-like shrubs (*ord.* Bruniaceæ), with heads of small flowers surrounded by glossy bracts, and small leaves. Propagation, by cuttings of the young growths under a bell-glass in sand. Soil, peat and sand.

Principal Species :—

ciliata, 1½′, Je., wh.
glutinosa, 3′, Ap., wh. (*syn.* Brunia glutinosa).
radiata, 1′, My., wh. (*syn.* Brunia radiata).

STACHYS. (WOUNDWORT. HEDGE NETTLE.)

An extensive genus of greenhouse or hardy annual, biennial, or perennial herbs (*ord.* Labiatæ), of which comparatively few are worth growing in the garden. Lanata is valued for its white, woolly leaves. Tuberifera is the Chinese Artichoke (*see* ARTICHOKE, CHINESE). Propagation, by seeds, the perennials also by division, and the biennials by cuttings. Common soil.

Principal Species and Variety :—

coccinea, 1′ to 2′, sum., grh. or hlf-hdy. per., sc.
germanica, 1′ to 3′, Ap., hdy. per., pale pk., wh.
— sibirica, pk. (*syn.* sibirica).
grandiflora, 1′, My., hdy. per., vio. (*syn.* Betonica grandiflora).
lanata, 1½′, Jy., hdy. Lamb's Ear.
maweana, 1′, Jy., hlf-hdy., pale yel., pur.
tuberifera, 1′, pk., seldom flowers, tubers edible (*syn.* affinis). Chinese or Japanese Artichoke, Crosnes.

Other Species and Varieties :—

albicaulis, 2½′, sum., hdy., vio.
alpina, 1′ to 4′, sum., hdy., pur.
— intermedia, lvs. more wrinkled.
angustifolia, 9″, Jy., hdy. sub-shr., pur.
arenaria, Jy., hdy., decumbent, pur.
aspera, 2′ to 4′, Jy., hdy., pur. or red.
Betonica, 6″ to 24″, Je., hdy., reddish pur. (*syn.* Betonica officinalis). Wood Betony, Bishop's Wort.
— alba, wh.
chrysantha, 6″ to 12″, sum., hdy., yel.
densiflora, 1½′, Je., hdy., flesh (*syns.* incana of *Botanical Magazine* 2125, and Betonica hirsuta).
grandidentata, 2′, sum., hdy. or hlf-hdy., vio.
inflata, 1½′, Jy., hdy. sub-shr., red.
lavandulæfolia, 2′, sum., hdy. sub-shr., rosy pur.
nivea, 1′, Jy., hdy. sub-shr., wh. (*syn.* Betonica nivea).
sibirica (*see* germanica var.).

STACHYTARPHETA. (BASTARD VERVAIN.)

Stove annual or perennial herbs, shrubs, or sub-shrubs (*ord.* Verbenaceæ), of which several are desirable for the garden. Propagation, the annuals

Squill, Roman (*see Hyacinthus romanus*).
Squill (*see Scilla*).
Squill, Striped (*see Puschkinia scilloides*).
Squinant (*Andropogon Schœnanthus*).
Squirrel-tail Grass (*see Hordeum*).
Stachychrysum (*see Piptadenia*).

by seeds, the perennial herbs by division, and the shrubs by cuttings in bottom heat, in sand, and covered with a bell-glass. Soil, sandy loam.

Principal Species :—

bicolor, 3′, Je., pur.
cajanensis, 3′, My., bl. (*syn.* cayennensis).
crassifolia, 2′, Je., bl.
dichotoma, 2′, Je., bl. (*syn.* urticifolia of *Botanical Magazine* 1848).
indica, 2′, Jy., bl. (*syn.* jamaicensis).
mutabilis, 3′, spr. to win., sub-shr., crim., ro. (*syn.* Verbena mutabilis).
orubica, 2′, Oct., sub-shr., pur. (*syn.* aristata).

STACHYURUS.

Ornamental half-hardy shrubs or small trees (*ord.* Ternstrœmiaceæ), with small flowers in spikes or bunches. Propagation, by cuttings of half-ripe shoots under a bell-glass. Common soil. Præcox should generally have the shelter of a wall.

Principal Species :—

præcox, 10′, Mch., yel. (*syn.* japonicus).

STACKHOUSIA.

A small genus of perennial greenhouse or hardy herbs (*ord.* Stackhousieæ), with erect stems, and white or yellow flowers in spikes. Propagated by division, or by cuttings of the young shoots under a glass. Common soil.

Principal Species :—

monogyna, 1½′, Ap., hdy. per., wh. (*syn.* linariæfolia).
spathulata, 1′, Ap., grh., wh.

STADMANNIA.

Stove trees (*ord.* Sapindaceæ). Propagation, by seeds sown in spring in bottom heat, by layers, or by cuttings of half-ripened shoots under a glass in sandy soil. Soil, sandy loam and leaf mould. They are little grown, the only species in cultivation at Kew being sorbifolia.

STÆHELINA.

A genus of half a dozen hardy or half-hardy subshrubs (*ord.* Compositæ), with narrow, purplish flowers.

Principal Species :—

arborescens, 4′, Aug., pur.
Chamæpeuce (*see* Cnicus Chamæpeuce).
dubia, 3′, Je., pur.

STAG BEETLE.

This (Lucanus cervus) is occasionally found in gardens in dead wood of Oak, Apple, Willow, and Poplar. It is easily recognised by the large size of its pinchers, but seldom does much damage.

STAKES.

Stakes may be of wood or iron, the former being much the more common. Wooden stakes for plants in pots should be painted green for appearance' sake and to make them more durable. They should be of various sizes, according to the height of the plant they have to support. Stakes for plants in the open, such as Dahlias, Hollyhocks, herbaceous plants, etc., should also be painted, and have the lower end charred to make it more durable. Bamboo stakes of all sizes are cheap and lasting, without being painted. Iron stakes should be painted green. Spirally twisted strong wire stakes are very useful for Carnations, etc., as the plants require no tying. Hazel and Spruce branches make very durable and serviceable Pea stakes.

Staff Tree (*see Celastrus*).

STANDARDS.

A term applied to trees having stems free from branches from 5′ to 6′ from the ground. They may be budded or grafted at this height, or the stem may be formed by the scion. For weeping and pendulous trees it is necessary to "work" on the stem at the required height. The side branches should not be removed all at once, but gradually, as this enables the stem to become thicker at an earlier date. Half-standards have clean stems from 3′ to 4′ in height. (*See also* FRUIT TREES.)

STANGERIA.

A small genus of slow-growing stove plants (*ord.* Cycadaceæ). Propagation, by imported seeds. Soil, fibrous loam three parts, peat one part, well decayed manure, and sand.

Only Species :—

Katzeri, 1′, lvs. few, pinnæ ten to twelve pairs, small.
paradoxa, 2′, trunk Turnip shaped, lvs. glabrous.
Schizodon, pinnæ irregularly toothed, more robust.

STANHOPEA.

Stove, epiphytic Orchids (*ord.* Orchidaceæ). The flowers are somewhat fugitive, but this is counterbalanced by the free flowering nature of the plants. Propagation, by division. Soil, rough peat, sphagnum, and charcoal, in Teak baskets. Owing to the racemes being pendulous, and often produced from the sides and bottom of the baskets, the potting material and sides of the receptacles must be very open. Less water is required when the plants are dormant.

Principal Species and Varieties :—

[NOTE.—s. = sepals, p. = petals, l. = lip.]

fregeana, yel., spotted pur., l. wh., pur. spots.
grandiflora, wh., crim. spots.
insignis, Aug., dull yel., stained pur., large, showy, fragrant.
— flava, yel., very sweet.
Lowii, yel., pur. spots, s. and p. whitish buff (*syn.* amesiana).
madouxiana, creamy wh., spotted pk., l. dark pur.
oculata, sum., lemon yel., lil. spots (*syn.* Ceratochilus oculatus); several vars.
— crocea, dark yel.
Ruckeri, pale yel., stained pk.
Shuttleworthii, apricot yel, pur. blotches, l. yel.; near insignis.
tigrina, sum., or. yel., blotched pur. br., very fragrant; one of the best (*syn.* tigrina superba). Lynx Flower.
— lutescens, bright yel., marked chocolate.
— nigro-violacea, brownish pur.
Wardii, sum., s. and p. golden yel., dotted pur., l. pale yel., pur. spots, fragrant. Aurea and venusta are vars.

Other Species and Varieties :—

amesiana (*see* Lowii).
Bucephalus, Aug., s. and p. pale yel., pur. spots, very fragrant, handsome (*syn.* jenischiana).
— guttata, apricot yel., br. marks.
— Roezlii, deep yel., pur. marks.
cymbiformis, pale yel., blood red spots.
devoniensis, Jy., creamy yel., crim. pur., very sweet.
eburnea, Je., wh., spotted pur. Spectabilis is a yel. var.
ecornuta, or. wh., pur. blotches (*syn.* Stanhopeastrum ecornutum).
gibbosa, Je., dull yel., blotched crim.; near Wardii).
inodora, pale yel.; amœna is a deep coloured var.
martiana, s. pale yel., p. wh., base crim., l. wh. (*syn.* velata).
nigripes, s. and p. yel., pur. spots., blk. centre.
ornatissima, or., spotted reddish br.
platyceras, yellowish pur.; near grandiflora.

Stanhopeastrum (*see Stanhopea*).

STANLEYA.

A small genus of hardy perennial herbs (*ord.* Cruciferæ). Propagation, by seeds and division in spring. Ordinary garden soil.

Only Species Introduced :—

pinnatifida, 3′ to 4′, sum., yel.

STAPELIA. (African Toad and Carrion Flower.)

A genus of over sixty species of dwarf, leafless, succulent stove and warm greenhouse plants from South Africa (*ord.* Asclepiadeæ). The flowers are generally large, and of some shade of livid purple and yellow, and possess a fœtid odour. Propagation, by cuttings in dry sand and broken bricks. Soil, very sandy loam and crushed bricks. They must be accorded abundance of sun and a dry atmosphere. (*See also* Cactus for general cultural details.)

Principal Species and Varieties :—

Asterias, 6″, sum., vio., yel., pur., stems erect. Starfish Flower.
desmetiana, 3″ to 9″, grn., pur., red.
gigantea, 6′, yellowish br., reddish pur., very handsome.
grandiflora, 1′, aut., pur., hairs wh., branches grey.
— lineata, yel. lines at base of flower.
lævis (*see* pedunculata).
maculosa, 1′, sum., yellowish pur., very fœtid.
namaquensis, 3″ to 5″, bright yel., dark pur. spots; one of best.
normalis, 6″, Aug., yel., blood red.
pedunculata, 3′, sum., dark red (*syn.* lævis).
pulchella, light yel., pur., br.
sororia, 5″ to 10″, Jy., pur., base or. yel.

Other Species and Varieties :—

barbata (now Huernia barbata).
bufonis (*see* normalis).
cruciformis (*see* olivacea).
hirsuta, 6′, sum., yel., vio., red.
mutabilis, 6″, Jy., greenish yel., pur. stripes.
olivacea, 3″ to 5″, Sep., br., olive grn., pur., very fœtid.
Plantii, Nov., creeping, yel., blk., pur.
pulvinata, aut., vio.

STAPHYLEA. (Bladder Nut Tree.)

Hardy, ornamental, deciduous shrubs (*ord.* Sapindaceæ). Propagation, by cuttings of half-ripe shoots by layers in autumn, suckers, and seeds. Soil, rich light loam. Colchica, Coulombieri, and pinnata are excellent for forcing.

Principal Species, Hybrids, and Varieties :—

Bolanderi, sum., wh.
Bumalda, 6′, Je. to Aug., wh.
colchica, 5′, sum., wh. (*syn.* Hooibrenckia formosa of gardens).
Coulombieri, 8′, late sum., wh.; hybrid (pinnata × colchica), very free flowering.
elegans Hessei, probably a hybrid (Coulombieri × pinnata).
pinnata, 10′, My., wh. Job's Tears, St. Anthony's Nut.
trifolia, 10′ to 12′, My., wh.

STARCH.

This carbohydrate, whose chemical formula, like that of sugar, is $C_{12}H_{20}O_{10}$, plays a very important part in the lives of most plants. It usually occurs, in the form of granules, in cell contents; and in tubers like those of the Potato, and thickened roots like those of the Beet and Carrot, it is stored in considerable quantities, whence the value of these vegetables for human food. Starch is formed, in the living plant, in two ways: (1) in the chlorophyll granules of the leaves, under the influence of sunlight, from the breaking up of carbonic acid gas (CO_2) and water (H_2O), and the rearrangement of their constituent elements; and (2) in the roots and other parts excluded from the light, from sugar, by the action of the leucoplastids. In such organisms as fungi, which have no chlorophyll and can make no starch, the necessary supply of starch is obtained from other organisms, or their dead remains, according as the fungus is parasitic or saprophytic. To sum up, starch may be considered as a comparatively insoluble carbohydrate, utilised by the plant for storing purposes. It may be converted from sugar, and the sugar may be reconverted into starch by the action of diastase, a ferment which is developed within the organism. The insoluble starch is soluble as sugar, and may then be readily conveyed to any part of the plant requiring nourishment. The malting of Barley is a familiar instance of this reconversion of starch,

Photo: D. S. Fish, Edinburgh.

Statice Suworowi (*see p.* 360).

Star Apple (*see Chrysophyllum*).

Starfish Flower (*see Stapelia*).
Star Flower (*see Aster, Sternbergia, Trientalis, and Brodiæa*).
Star Grass (*Aletris farinosa*).
Star Head (*see Scabiosa*).
Star Hyacinth (*see Scilla amœna*).
Star of Bethlehem (*see Ornithogalum umbellatum*).
Star of Jerusalem (*Tragopogon pratensis*).
Star, Sea (*Aster Tripolium*).
Star Thistle (*Centaurea calcitrapoides*).
Starwort, Italian (*Amellus Lychnitis*).
Starwort (*see Aster and Stellaria*).

but it is a regular occurrence in all plants, especially those which store up quantities of starch, as in the thickened roots and tubers referred to.

STATICE.

Ornamental greenhouse shrubs, and hardy and half-hardy herbaceous perennials (*ord.* Plumbagineæ), for the most part. Propagation, cuttings for the shrubs, division for the perennials, and seeds for the annuals and biennials. Soil, light sandy loam. Soot is an excellent stimulant applied as a top-dressing.

Principal Species, Hybrid, and Variety :—

arborea (*see* fruticans).
callicoma, Jy., hlf-hdy., pk.
elata, 2′, Jy., hdy., bl.
floribunda, vio. bl.
fruticans, sum., hlf-hdy. shr., bl. (*syns.* arborea and arborescens).
Gmelini, 1′ to 2′, sum., hdy., dark bl.
Halfordii (*see* macrophylla).
incana nana, 9″, sum., hdy., pk.; probably a var. of tatarica.
latifolia, 1′, Je., hdy., bl. one of the best.
macrophylla, 2′, My., hlf-hdy. shr., pale bl. (*syn.* Halfordii).
profusa, 2′, Aug., grh., bl.; hybrid (puberula × macrophylla).
reticulata, 1½′, Jy., hdy. per., bl. (*see p.* 361).
rosea, 1½′ to 2′, sum., ro.
sinuata, 1′, hlf-hdy., sum., pur.
Suworowi, 1′ to 2′, hdy. ann., sum., pk., lil., good for pots (*syn.* Candelabra *see p.* 359).
tatarica, 1′, sum., hdy., red, bl.
— angustifolia, lvs. narrow.

Other Species :—

Ararati (*see* Acantholimon glumaceum).
auriculata, 6″, sum., hdy., pur.
australis, 1′, sum., hdy., yel. (*syns.* sinensis and Fortunei).
arborescens (*see* fruticans var.).
Bonduelli, 1′ to 1½′, Je., yel.
Bourgæi, sum., grh. shr., pur., wh.
Limonium, 1′ to 1½′, sum., hdy., bluish pur. Common Sea Lavender.
— alba, wh.
minuta, 4″, Jy., hdy. per., lil. or pur.
puberula, Jy., grh., vio.

STATUARY.

The extent to which statuary may be introduced into a garden, and with good effect, not only depends very much upon the style of the garden, but is also a matter for individual taste to decide. As a rule, it is most in keeping with the straight lines and exact curves of the geometrical garden near the house, and it associates well with the clipped Yews and closely trimmed hedges still occasionally seen. Grouped in the centre or placed round the sides of ornamental fountains or stone basins filled with ornamental water, no fault can be found with it, although it is distinctly out of place in gardens where natural styles are followed. In the conservatory statues are frequently made good use of, and in a structure furnished upon semi-drawing room, semi-greenhouse lines, marble and other statues appear at their best. Their employment in this way is probably better exemplified at the Crystal Palace than anywhere else.

STAUNTONIA.

Hardy evergreen climbing shrubs (*ord.* Berberideæ). Propagation, by cuttings of half-ripened shoots in sand, in a close case. Soil, sandy loam and leaf mould. The shoots should be cut back after flowering.

Principal Species :—

hexaphylla, Ap., wh., fragrant.
latifolia (*see* Holboellia latifolia).

STAURANTHERA.

Stove herbs (*ord.* Gesneraceæ). Propagation, by seeds and cuttings. Soil, loam two parts, leaf mould one part, with decayed manure and sand.

Only Species Introduced :—

grandifolia, 1′, Aug., wh., tinged pur., yel., lvs. 9′ to 10′ long.

STAUROPSIS.

A small genus of stove epiphytic Orchids (*ord.* Orchidaceæ). Propagation, by division. Culture as for Cattleya (which *see*).

Principal Species :—

Batemanni (*see* lissochiloides).
fasciata, wh., yel. and pur. marks (*syn.* Trichoglottis fasciata).
gigantea, spr., yel., br. marks (*syn.* Vanda gigantea).
lissochiloides, Jy., yel., crim., rosy pur. (*syns.* Batemanni, Fieldia lissochiloides, Vanda Batemanni, and V. lissochiloides).
warocqueana, yel., reddish br., lip wh., spotted ro.

STAUROSTIGMA.

Tuberous, stove plants (*ord.* Aroideæ), of little garden value. Culture as for Caladiums. Concinnum, luschnathianum, and riedelianum have been introduced.

STEIRONEMA.

Hardy perennials (*ord.* Primulaceæ) closely related to Lysimachia, like which they may be treated.

Principal Species :—

heterophyllum, yel. (*syns.* Lysimachia lanceolata and L. ciliata, and S. lanceolatum).

STELIS.

A large genus of small-flowered Orchids (*ord.* Orchidaceæ). They may be grown with the cool Masdevallias (which *see*).

Principal Species :—

Bruchmülleri, Dec., yel., pur.
ciliaris, 6″, Feb., deep pur.
grandiflora, Jy., br.
ophioglossoides, Sep., grn.
sesquipedalis, Aug., yel.

STELLARIA. (Starwort, Stitch Grass.)

A large genus of hardy plants, chiefly annuals (*ord.* Caryophylleæ), of little garden value. Propagation, by seed. Any garden soil. Graminea aurea, a perennial, is used for carpet bedding.

STELLERA.

Hardy perennials and shrubs (*ord.* Thymelæaceæ). Propagation, by seeds. Ordinary soil. Chamæjasme (*syn.* altaica), the Ground Jessamine, is probably lost to cultivation.

STEMODIA.

Stove, greenhouse, and half-hardy herbs (*ord.* Scrophularineæ), few of which are of garden value. Propagation, by division and seeds. Soil, light, rich loam.

Principal Species :—

chilensis, 1′, Sep., bl.
durantifolia, 1′, ann., bluish pur.
lobelioides, 1′, Aug., hlf-hdy., deep bl. (*syn.* Gratiola tetragona of *Botanical Magazine* 3134).

Stauracanthus (*see Ulex*).
Staves-acre (*Delphinium Staphysagria*).
Stemmatium (*see Tristagma*).

STEMONA.

Stove climbers (*ord.* Roxburghiaceæ), with showy, fœtid flowers. Propagation, by cuttings and suckers. Soil, light, rich loam.

Principal Species :—

Curtisii, sum., grn., br., pur. — to 6″ long (*syns.* glorioides, Roxburghia gloriosa, and R. viridiflora).
tuberosa, Jy., grn., lvs. 4″

STEMS.

The stem may be defined as the ascending axis of the plant, whose function it is to bear the leaves, branches, and flowers. It may be simple, *i.e.* undivided, as with most Palms, or be many times forked, and carry a great head of branches, as in the case of large trees. The duration may be annual, as with all annual plants and most biennials; or perennial, as with trees and shrubs generally. The structure may be herbaceous, *i.e.* soft, and not woody, as with all herbaceous plants; or hard and woody, as with trees and shrubs generally. It may be erect, with short nodes (joints), and capable of bearing its own weight and that of its leaves and branches, or it may be comparatively thin and less rigid, although wiry, and obtain support by climbing by one of the various means of which plants avail themselves. Apart from these general qualities, there are many minor ones, which have all to be dealt with when determining the character of a stem; these, however, cannot be treated upon in a work of this scope.

Apart from the bearing of the leaves, branches, and flowers, the stem acts as a channel along which the supply of nutriment drawn up by the roots may pass, both before elaboration by the leaves and after. The woody cylinder is for the most part of mechanical service only, the cambium layer being the only living part; this applies to old stems.

STATICE RETICULATA. (THE SMALL RADICAL LEAVES ARE HIDDEN BY THE MASS OF ASPARAGUS-LIKE FLOWERING BRANCHES; *see p.* 360)

Passing from the outside to the centre in the transverse section of a young Dicotyledonous stem, the zones of tissue passed through are (1) the epidermis; (2) the cortex, in which the vascular bundles are embedded in a ring; (3) the medullary tissue or pith. In an old stem there would be (1) the bark, outer; (2) the bark, inner; (3) the ring of cambium, which is now continuous; (4) the wood; (5) the much compressed remains of the pith. The cambium layer is of the highest importance, since it is by the growth and division of its cells that the stem year by year increases in thickness, a zone of wood being annually formed to the inside and a zone of bark (phloëm) to the outside. Success in the operations of budding and grafting depends upon the bringing together of the respective cambium layers in stock and scion;

Stemonacanthus (*see Ruellia*).

unless this is done failure will result, no matter what the system may be.

In Monocotyledons the vascular bundles (closed) are not arranged in a ring, but are distributed over the entire stem. In a transverse section this distribution appears to be irregular, and apparently governed by no special rule.

STENACTIS (*see* ERIGERON).

STENANDRIUM.

Stove and greenhouse herbs (*ord.* Acanthaceæ). Propagation, by seeds. Soil, loam, peat, and sand.

Principal Species :—

igneum, st., yel.
Lindeni, st., yel., lvs. greenish yel.; a good foliage plant for edging.

STENANTHIUM.

Greenhouse or hardy bulbous plants (*ord.* Liliaceæ). Propagation, by division. Light, loamy soil.

Principal Species :—

angustifolium, 2′ to 3′, Je., hdy., greenish wh.
— gramineum, fewer flowers, lvs. narrower (*syn.* Helonias graminea).
frigidum, 2′, Je., hdy., pur.
occidentale, sum., hdy., dark pur.

STENIA.

A small genus of Orchids (*ord.* Orchidaceæ), which are not much cultivated. Propagation, by division. Compost, rough peat and sphagnum, in an intermediate house.

Only Species :—

fimbriata, pale yel., brownish pur. spots (*syn.* Chondrorhyncha fimbriata).
guttata, pale yel., pur. spots.
pallida, aut., citron yel., lip spotted red.

STENOCARPUS (*syns.* AGNOSTUS and CYBELE).

Greenhouse, evergreen trees (*ord.* Proteaceæ). Propagation, by seeds. Soil, two parts peat, one part loam, and sand.

Principal Species :—

Forsteri, 3′, Je., wh.
salignus, 3′ to 20′, Je., grn. Beef Wood.
sinuatus, 20′ to 100′, Je., bright red. Fire Tree, Queensland Tulip Tree.

STENOGLOTTIS.

Deciduous, terrestrial Orchids (*ord.* Orchidaceæ). They are found in carpet-like masses in moist situations in partial shade, usually among rocks, in South Africa. They succeed in the warmer Odontoglossum house. Propagation, by division in spring. Soil, fibrous loam, leaf mould, and silver sand. Throughout the growing season plenty of water is required, reducing, but never entirely withholding, the supply as the leaves decay.

Only Species :—

fimbriata, spike 6″ to 12″, Sept., rosy pur., lvs. dark pur. spots.
longifolia, spike 1′ to 1½′, Sept., mauve pur.

STENOMESSON.

South American, greenhouse, bulbous plants (*ord.* Amaryllideæ), with large umbels of showy, tubular, red, pink or orange coloured flowers. The flowers in most species appear simultaneously with the leaves. Propagation, by dividing the bulbs at the time of potting. Soil, similar to that for Amaryllises, which *see*. Repotting must be done in winter or very early spring.

Principal Species and Varieties :—

aurantiacum, 1′, My., yel. (*syn.* Hartwegii); may be given a sheltered border.
— coccineum, sc.
incarnatum, 2′, Aug., red.
— fulvum, brownish yel.
— trichromum, sc.
luteo-viride, 1′, Ap., greenish yel.
Pearcei, 2½′, My., yel.
suspensum, 1′, My., sc.
viridiflorum, 1′, Ap., grn.

Other Species and Varieties :—

flavum, 1½′, My., yel.
— curvidentatum, yel.
— latifolium, lvs. large.

STENOSPERMATION.

Stove herbs or sub-shrubs (*ord.* Aroideæ), rarely seen outside botanic gardens. Propagation, by division or by cuttings. Light, peaty soil.

Principal Species :—

multiovulatum, 1′ to 2′, sum., wh.
Wallisii, 1′, sum., wh. (*syn.* popayense).

STENOTAPHRUM.

Dwarf Grasses (*ord.* Gramineæ) with creeping stems. Glabrum (*syn.* americanum) and its variegated form are useful for the greenhouse border, or for basket work. Propagation, by cuttings or division. Soil, loam, leaf mould, and sand.

STEPHANANDRA.

Hardy shrubs (*ord.* Rosaceæ) of graceful habit, bearing numerous small, whitish flowers. In winter Stephanandras are conspicuous by reason of their light brown bark, and a group helps to brighten up the shrubbery. Propagation, by cuttings of half-ripe shoots 4″ to 6″ long, in a cold frame in July. Any good garden soil will suit the plants very well.

Principal Species :—

flexuosa, 3′ to 4′, Jy., wh. (*syns.* incisa and Spiræa incisa).
Tanakæ, 3′, Jy., wh.

STEPHANIA.

Stove or greenhouse climbing plants (*ord.* Menispermaceæ) with roundish leaves and small inconspicuous flowers. Propagation, by seeds. Any good soil.

Principal Species :—

discolor, 6′ to 12′, sum., st., br. (*syn.* hernandiæfolia).
rotunda, 8′, sum., grh., br.

STEPHANOCOMA.

Thistle-like herbs from South Africa (*ord.* Compositæ), of no horticultural value. Carduoides (correctly Berkheya carduiformis), the only species, grows 2½′, and bears small heads of yellow flowers in autumn. Loamy soil.

STEPHANOTIS.

Description.—A genus of stove climbers (*ord.* Asclepiadeæ). Only one species, floribunda, is extensively cultivated. This, by reason of the

Stenanthera (*see Astroloma*).
Stenochlæna (*see Acrostichum and Lomaria*).
Stenocoryne (*see Bifrenaria*).
Stenogastra (*see Sinningia*).
Stenorhynchus (*see Spiranthes*).
Stenosemia (*see Acrostichum*).
Stephanolirion (*see Tristagma*).
Stephanophorum (*see Narcissus*).
Stephanophysum (*see Ruellia*).

beautiful, white, fragrant flowers it so freely produces, is exceedingly popular.

Propagation.—By cuttings of the firm side growths of a previous season, placed singly in 2″ pots. Spring is the best time to propagate; loam, peat, and sand make a suitable compost, and 65° to 75° is a suitable temperature. Cover with a bell-glass to ensure a close, moist atmosphere.

Soil.—Turfy loam, if not very retentive, should form at least half the compost, making up the other half with peat, sand, and a little dried cow manure. Free drainage is essential. Where a large roof area is available for the extension of growth it is advisable to plant the Stephanotis in a bed of soil, increasing the root area as the growths extend.

Other Cultural Points.—From early spring to late autumn abundance of moisture in the soil and atmosphere is essential, and during the same period syringing twice a day is desirable, provided all expanded flowers are first removed if they are needed for floral designs. From October to March a considerably reduced water supply will suffice, and the lower temperature (55° to 65°) of a stove during that period will ensure some amount of rest. Thin out weak growths at all seasons, and regularly attend to tying and training. Crowded growths flower sparingly and are difficult to keep clean. An annual pruning to keep the plant within bounds, and also to promote new growths from the main stem, is generally desirable, and should take place in January and February.

Insect Enemies.—Green fly is seldom a serious pest, but it frequently attacks the slender, growing points. Fumigation, and syringing with tobacco solution, will remove it. Mealy bug is the greatest enemy of the Stephanotis, and it is only by constant attention to tying, thinning, syringing, and sponging that it can be kept down. This pest so soon renders the exquisite flowers unsightly that no efforts should be spared to keep it at bay. Fortunately, when resting, the Stephanotis will stand strong insecticides without injury, so that during the winter season dilute paraffin emulsion can be effectively used to dislodge the pests from plant, trellis, and woodwork.

Principal Species and Variety :—

floribunda, 30′, spr. to win., waxy wh., fragrant.
— Elvaston var., 15′, wh., flowers freely when quite small.
Thouarsii, 10′, My., wh.

STERCULIA.

A widely distributed genus of evergreen stove or greenhouse trees and shrubs (*ord.* Sterculiaceæ). The flowers are showy, in panicles, and remarkable for the absence of petals. Rupestris is, in a young state, much like Aralia Veitchii. Propagation, by cuttings of well-ripened growth, in sand or very sandy soil, in a close case. Soil, equal parts of loam and peat with plenty of sand.

Principal Species :—

Balanghas, 30′, sum., aut., pur.
Bidwillii, 20′, aut., red (*syn* Brachychiton Bidwillii).
discolor, 20′ to 40′, sum., rosy red.
rupestris, 10′ to 25′, sum., br. (*syns.* Delabechea rupestris, Oleobachia macrophylla, and O. rupestris), Bottle Tree.

Other Species :—

acerifolia, 20′ to 120′, sum., red (*syn.* Brachychiton acerifolium).
colorata, 30′, sum., sc.
diversifolia, 20′ to 60′, sum., yel. (*syns.* heterophylla and Brachychiton diversifolium).
Ivira, 20′ to 60′, Jy., yel.
lanceolata, 20′, sum., reddish br.
macrophylla, 20′, Jy., yel.
neocaledonica, 10′ to 20′, sum., red, gold.
platanifolia, 10′ to 30′, sum., grn. (*syn.* pyriformis).
Tragacanthæ, 20′ to 40′, My., reddish br. Tragacanth Gum Tree.
villosa, 20′, Je., pk., yel.

STEREOSPERMUM.

A small genus of greenhouse trees, shrubs, or shrubby climbers (*ord.* Bignoniaceæ), which bear fragrant white flowers in summer. They are not in general cultivation. Similar treatment to that recommended for Bignonias is suitable.

STEREUM.

A genus of Fungi the members of which are often found growing on the dead trunks of trees. Purpureum is very partial to the Poplar, hirsutum to the Oak, and sanguineolentum to Conifers. The genus is characterised by its extreme toughness. Some of the species are very ornamental.

STERIPHOMA.

Stove shrubs (*ord.* Capparideæ) with ornamental, orange coloured flowers. Propagation, by cuttings of short shoots in sandy soil in a close case. Soil, two parts fibrous peat, two parts fibrous loam, and one part sand.

Principal Species :—

elliptica, 3′, sum., or. yel.
paradoxa, 6′, sum., or.

STERNBERGIA.

Beautiful, dwarf, hardy bulbous plants (*ord.* Amaryllideæ), bearing large, Crocus-like flowers in spring and autumn. Propagation, by offsets. Soil, moderately light and well-drained loam with which limestone or lime rubbish is incorporated. The position should be a sunny one. Summer is the best planting time. Cover the bulbs with about 2″ of soil. Grown in deep pans, most of the species are suitable for conservatory decoration, but when so treated they should have the shelter of a cold frame directly the flower buds appear.

Principal Species :—

fischeriana, 6″, spr., light yel.
lutea, 8″, Oct., yel. (*syns.* Amaryllis lutea and Oporanthus lutea).
macrantha, 8″, aut., golden yel. (*syn.* clusiana of Boiss., not Ker.).

Other Species :—

colchiciflora, 6″, aut., yel. (*syns.* clusiana of Ker., not Boiss., Amaryllis citrina and colchiciflora).

STEUDNERA.

Perennial stove herbs (*ord.* Aroideæ). Their chief merit lies in their ornamental leaves. The several species are, however, not in general cultivation. Treat as recommended for Alocasias.

Principal Species :—

colocasiæfolia, 2′, sum., yellowish br.
discolor, 1½′, sum., yellowish br.

STEVENSONIA.

A monotypic genus of stove Palms (*ord.* Palmæ). Grandifolia, a native of the Seychelles, forms a noble specimen with a rather slender trunk 40′ high, armed, especially when young, with stout spines, and crowned with a large head of ornamental bifid leaves 5′ to 6′ long by 4′ wide. The leaves are often covered with yellow blotches,

which is a natural feature. Soil, fibrous loam with a little peat and plenty of sand. Abundance of heat and a moist atmosphere are essential (*syns.* Areca Seychellarum, Astrocaryum borsigianum and A. aureo-pictum, and Phœnicophorium Seychellarum).

STEVIA.

Stove, greenhouse or hardy shrubs, sub-shrubs, or herbs (*ord.* Compositæ), with whitish or purplish flower heads. Although a large number of species have been described, very few are worthy of cultivation. Propagation, by cuttings of young wood, or by division in the case of the herbaceous species. Light, loamy soil.

Principal Species :—

Eupatoria, 2′, sum., hdy., pk.
glutinosa, 2′, sum., grh., pk.
ivæfolia, 2′, sum., grh., wh.

STILLINGIA.

Of the dozen or more species (*ord.* Euphorbiaceæ), sebifera, the Chinese Tallow Tree, is the best known. Its wood, which is very hard, is used by the Chinese for engraving. It grows 15′ to 20′ in height, and bears yellow flowers.

STIPA.

Description.—Perennial Grasses (*ord.* Gramineæ), mostly hardy, more or less beautiful as garden plants, and useful when in bloom for cutting, as their plumes associate readily with most cut flowers. The Feather Grass, pennata, is quite popular, while another species, tenacissima, has an economic value, as it enters into the manufacture of high class paper, and is popularly known as Esparto Grass.

Stigmaphyllon ciliatum.

STIFFTIA (*syns.* Aristomenia, Augusta, and Sanhilaria).

Stove shrubs or small trees (*ord.* Compositæ), with entire, leathery leaves and yellowish flowers. Propagation, by cuttings of half-ripe shoots in sandy soil in a warm, close case. Soil, two parts of fibrous loam to one part of leaf mould and sand.

Principal Species :—

chrysantha, 6′, spr., or. yel.

STIGMAPHYLLON.

Ornamental, climbing, stove shrubs from tropical America (*ord.* Malpighiaceæ). Propagation, by cuttings of half-ripe shoots in sandy soil in a close case. Soil, two parts fibrous loam, two parts peat, and one part sand.

Principal Species :—

ciliatum, 10′, Je., yel. (*see* figure).

Other Species :—

acuminatum, 10′, Jy., yel.
affine, 8′, Jy., yel.
bogotense, 15′, My., yel.
ellipticum, 10′, Sep., yel.
fulgens, 15′, Aug., sc.
littorale, 12′, aut., yel.
retusum, 20′, sum., yel.

Propagation.—By division in spring; by seeds sown in shallow boxes of light soil in spring in a temperature of 50° to 60°, subsequently hardening off the seedlings ready for planting out in May or June; by seeds sown in any light soil out of doors in April.

Soil.—Ordinary garden soil suits if the situation be a sunny one.

Principal Species :—

elegantissima, 3′, sum., grh., grn.
gigantea, 3′, sum., grn.
pennata, 2′, sum., grn.
tenacissima, 4′, sum., grn.

Other Species :—

capillata, 2′, Jy., grn.
humilis, 6″, Jy., grn.
juncea, 3′, sum., grn.

Stinging Bush (*Jatropha urens*).
Stinging Nettle (*see Urtica*).
Stink Fly (*see Ichneumon Fly*).
Stinking Cedar (*Torreya taxifolia*).
Stinking Gladwyn (*see Iris fœtidissima*).
Stinking Yew (*see Torreya*).
Stinkwood, Tasmanian (*Zieria Smithii*).

STOCKS, FRUIT.

The majority of the varieties of the larger kinds of fruits do not crop satisfactorily when growing upon their own roots. They are, therefore, "worked" upon certain stocks. The best stocks are, for bush and pyramid Apples, the Broad-leaved English Paradise; for standard Apples, the Crab and Free; for bush and pyramid Pears, the Quince; for standard Pears, the Pear; for Peaches and Nectarines, the Damas Noir and St. Julien Plums; for Cherries, the Gean, Mahaleb, and Morello; and for Plums, the Mussel, St. Julien, and White Pear Plum. The process of working is by budding or grafting, which *see*.

STOCKS, GARDEN.

Description.—In the Stocks that are grown in gardens for the beauty and fragrance of their flowers there are broadly three divisions: (1) Ten-Week, (2) Brompton, and (3) Intermediate. The varieties in these sections have been raised mainly from Mathiola incana, M. i. annua, and M. sinuata (*ord.* Cruciferæ). These clearly defined sections are more or less subdivided.

Ten-Week Stocks.—This, the most popular section, comprises those which flower throughout the summer. The plants are easily grown, and if the strain is a good one a fine proportion of double varieties will be secured. There are sure to be a number of singles in each packet, and where beds of Stocks are grown the plants should be about 4″ or 5″ apart, so that when observable the singles may be drawn out without spoiling the effect of the bed. If one could ensure all double plants 10″ to 12″ asunder on well-enriched, deeply dug ground would produce a superb display. Seeds should be sown in shallow pans or boxes of light, sandy soil in March, and as soon as possible the seedlings should be pricked out into other receptacles. The next move ought to be either singly into small pots or 6″ apart in lines on a special bed of soil made up in a frame, whence the plants may be transferred to the positions in which they are to flower. This should be done early in June, a little earlier or a little later according to the condition of the soil and the weather. Or seeds may be sown out of doors in April, and the plants, with attention to thinning, will flower in August. When used for bedding, Ten-Week and Pyramidal Ten-Week Stocks should be properly staked, and if liquid manure be generously applied as the plants advance into flower the spikes will be much improved in size and substance. A few plants should always be grown in pots, if only for their delicious fragrance. Successional sowings may be made in accordance with requirements. The varieties are usually sold in packets of distinct colours.

Selection of Ten-Week Stocks:—

Large Flowering, 1′, sum.; many vars.
Large Flowering Pyramidal, 1½′, sum.; many vars.
Dwarf German, 1′, sum.; many vars.
Robust Rocket, 2′, sum.; many vars.
Wallflower-leaved, 1½′, sum.; many vars.

In addition to these there are several varieties with distinctive names, all of which range from 1′ to 2′ high, and flower in summer.

Brompton Stocks.—These are biennials, and comprise a much more limited range of colour than is found in the Ten-Week section. Though reputedly very hardy, many plants die off every winter, and for this reason they have not the popularity of those already mentioned and the Intermediate type. Seeds should be sown in July or August in the same manner as Ten-Week Stocks, but the young plants are best wintered in frames and planted in the early spring, when they will soon flower. The soil must be deep and well drained, particularly when they are wintered out of doors, where they must have protection from sharp frosts and cutting winds. Seeds sown in March will flower in September. The Queen Stock is probably a form of the Brompton, and requires similar treatment.

Selection of Brompton Stocks:—

Brompton, 1½′, spr., aut.; many vars.
Queen, 1½′, spr., aut.; many vars.

Intermediate Stocks.—This is a splendid section, which, with the Ten-Week, will provide fine flowers for many months of the year. Seeds sown in cold frames in July will produce plants for flowering in spring, and those from a March sowing will commence to flower in August and continue through September, and often later. The Ten-Week flowers in the summer, and thus a very prolonged season is secured. The plants are dwarf and bushy in habit, and produce spikes with considerable freedom. The seedlings must be allowed ample room for development, as attenuated plants never give the same satisfaction as those which have come on sturdily and strongly from the very first.

Selection of Intermediate Stocks:—

Intermediate, 1½′, spr., aut., crim., pur., sc., wh.
East Lothian, 1¼′, spr., aut., crim., pur., sc., wh.; a magnificent form.
Emperor, large flowering, 1½′, spr., aut.; many vars.
Giant Cape, 1½′, spr., aut., crim., pur., sc., wh.

STOCK, VIRGINIAN (*see* MALCOMIA).

STŒBE.

Small, evergreen, greenhouse shrubs from South Africa (*ord.* Compositæ), of no horticultural value.

STOKESIA.

Cyanea is the only known species (*ord.* Compositæ). It is a perennial herb, suitable for the greenhouse or outdoors. It grows 1½′ in height, has alternate, lanceolate leaves, and bears numerous Aster-like heads of blue flowers in August. Propagate by division in spring. Loamy soil.

STOKING.

Though not a pleasant operation, this is assuredly one of the most important, and upon its proper performance will greatly depend the successful culture of plants under glass. An annual examination of the boiler and appurtenances should be made by an expert in August, or some time when the services of the fire can be dispensed with for a time. Foul chimneys should then be cleansed, all defective valves and joints repacked, and any dilapidations repaired.

Given a clean start, a monthly clearance of the flues should suffice throughout the winter to keep the fire going well, though where coal is used, and

Stissera (*see Curcuma*).
Stitchwort (*see Stellaria*).
Stizolobium (*see Mucuna*).
Stobæa (*see Berkheya*).

the flue system is complicated, fortnightly cleanings will be advantageous. Always commence at the top flue and work downwards until the soot and ashes are removed from the lowest flue door. Bass brushes will clean flues more satisfactorily than the hair ones generally sold for the purpose, and can be made of any desired length.

In upright boilers where the smoke escapes through an orifice at the side of the fire, small pieces of coke often find their way through this into the flue. A piece of hoop iron, bent into a hook and fixed to the end of a pliable rod, is useful for removing these, and three wire nails driven into a narrow piece of board will make a useful candle holder, which may be pushed into the flue to afford light to the operator.

Next in importance to clean flues is an empty ashbox, and this should always be cleaned out at least twice daily during severe weather; in hot weather a full ashbox is useful in retarding draught.

On examining a fire in the morning the dampers should be drawn out to the full length, and the dead fuel removed from inside the furnace door until the state of the fire can be seen. If the fire be very low, a thorough loosening should be given, all the clinkers and dirt removed, the ashbox emptied, and a very little dry, fine fuel added. More should be given when the fire is burning clearly—say, in an hour's time.

When fires are being driven hard there will generally be found a large clinker partly or wholly covering the fire-bars in the morning. This should not be removed, unless there is a good body of keen fire, or its withdrawal may often mean that of the greater bulk of the fire, and its consequent extinction. If possible, it should be broken up with the clinkering or stripping iron so as to allow of draught passing between the pieces, or, failing this, be turned on its edge until such time as the amount of fire at command will allow of its safe removal.

In stirring a fire be sure that the tool used passes well along the furnace bars to the back, using it then as a lever to thoroughly loosen the fuel and permit the free passage of air, without which satisfactory combustion cannot take place.

It is the best policy to never keep the furnace more than half full of fire, as then the best work is performed. A small body of fire can also be more easily controlled than a large one, and in the event of bright sunshine following on a cold frosty night this is of great importance. In this contingency all draught should be taken off, both top and bottom, the furnace filled up with fuel, and the front of the fire well covered with wet ashes.

In making up a fire for the night it should first be ascertained that the temperature is up to, or slightly above, the average; then the furnace should be filled completely up with finely broken fuel; this is important, as it is evident that more small fuel can be accommodated than large lumps. All the draught should be taken off, with the exception of 1″ or 2″ of one damper, and if any doubt is felt as to the lasting properties of the fire, a shovelful of dry ashes may be thrown on the front to steady it. It is unwise to use large quantities of ashes for banking up; they mean bigger clinkers next morning.

Stonecrop (*see Sedum*).
Stone Pine (*see Pinus Pinea*).

STOPPING.

Stopping is carried out while plants are in full growth, and is practised (1) to keep plants in symmetrical shape, (2) to keep them bushy by inducing back buds to push, and (3) in the case of subjects designed to occupy a given space, to keep them within their allotted bounds.

The time of a plant's flowering may also be regulated by intelligent stopping, and plants are by this means brought to perfection at a given date, as in the case of exhibition plants. From ten to twelve weeks is the usual time allowed between the last stopping and the date of exhibiting, but no hard and fast rule can be laid down, as, naturally, conditions differ.

The laterals on Grape vines are generally stopped at two or three joints beyond the fruit; Cucumbers and Melons at one or two. Chrysanthemums, Fuchsias, double Petunias, Bouvardias, and Heliotropes are stopped to retard flowering or induce back growths to push. Fruit trees generally are stopped in summer, at six or eight joints, to plump up the basal buds to which pruning is performed in winter.

STOVE.

A stove is a house wherein the night temperature in winter is never allowed to fall below 55° to 60°, with a rise of 5° to 10° in the day. In addition to a liberal amount of heat, it should also have an atmosphere heavily charged with moisture, as the plants are natives of moist, tropical regions.

Some stoves have large tanks sunk in the ground beneath them, which are covered by open iron gratings that allow of a steady and constant supply of vapour. If these tanks are accessible for dipping purposes they serve a double purpose, and may also be used to receive the rain water from the roof of the house.

When the house is not provided with tanks of the above description, concrete or cemented ones will be found the best, and these may be so built as to allow of a small pipe being taken through them from the flow pipe of the heating apparatus. This will ensure a constant supply of tepid water, which will be found extremely useful for syringing, watering, and sponging purposes. A central plunging bed is provided in most stoves, beneath which hot-water pipes are carried to supply the bottom heat. This plunging bed should have a 6″ layer of coal ashes or Cocoanut fibre refuse laid over its surface, in which the pots may be plunged. Cocoanut fibre refuse is lighter than ashes, more retentive of moisture, and keeps freer from vegetable growths; but, on the other hand, ashes are less agreeable to many of the insect pests which attack plants in warm houses.

A very useful means of ensuring a moist atmosphere is to cover the stages with corrugated iron, and place a layer of shingle or coal ashes over these. Stove plants require to be shaded from the fiercest rays of the summer sun, but should have all the diffused light possible. Air should be given in moderation, but never so as to come into direct contact with the plants, especially if at all cold. It will generally be found that sufficient air will enter between the laps of the glass during the winter months, and that the top ventilators may then be kept closed. Many stove plants are greatly benefited by a turn in the greenhouse during the

Storax (*see Styrax*).
Stork's-Bill (*see Pelargonium*).

summer months, as the additional air and sun ripen their growths, improve their colour, and ensure their passing through the winter in good condition. Thorough cleanliness in regard to the structure, the pots, and the plants is the great secret of successful cultivation.

STOVES.

Stoves are generally employed for heating small structures or those to which it is inconvenient to affix a boiler. They are broadly divided into two sections—gas and oil—and many very ingenious examples of each are on the market. The best stoves are fitted with hot-water pipes, and as they are generally stood or fixed inside the structure to be heated, their effect upon the temperature is naturally considerable.

The best makes of gas stoves are provided with a length of pipe to carry the fumes off, either at the side or through the roof of the house. Gas stoves are less troublesome to manage than those burning oil, the chief attention necessary being the removal of the carbon which forms in flakes over the surface upon which the flame impinges.

If oil stoves are used, particular care should be exercised with regard to cleanliness, the wick being trimmed daily (this trimming does not necessarily mean cutting with scissors—a rubbing off of the charred parts will suffice), the oil containing vessel being emptied of dirty accumulations periodically, and the wick being scalded with boiling water occasionally. Stoves with circular wicks are generally more powerful in proportion to size than those with flat ones, but the wicks require rather more care in cutting and keeping level; the winding apparatus, too, is rather liable to get out of order. An important item in the prevention of smell and smoke is to see that all parts intended to be shut are closed tightly, as the slightest draught in the wrong place is very prolific of both. The wick should not be turned high at lighting, as the flame invariably works up somewhat; neither should it be turned down unduly to moderate the heat, or a very powerful and injurious stench will result.

STRANVÆSIA.

Half-hardy evergreens (*ord.* Rosaceæ) composed of four species. Glaucescens grows 20′ in height, and bears white flowers in June. Propagation, by seeds. Good loamy soil.

STRATIFICATION.

The arrangement of various kinds of soils or rocks in layers is designated stratification, each layer being a stratum. Igneous rocks are not stratified, but those of aqueous origin always are, though often, owing to some upheaval, the strata are so folded that it is difficult to follow the various layers. Rocks formed by the agency of water are either sedimentary, as clay, gravel, loam, sand, shale, and marl, or are formed by the decay of plants or animals. To the first of the two latter coal, graphite, lignite, and peat owe their origin; while to the decay or deposits of animals such rocks as limestone (including chalk), flint, guano, and coprolites are due. In the work of deep trenching or draining a garden, two or more layers of rock—geologists regard all soil as rock—are frequently cut through, while in a deep railway cutting, quarry, or mine shaft stratification is very noticeable.

The seeds of such plants as Hawthorn (Cratægus), Holly (Ilex), Roses, and Plums are often laid in alternate rows of soil and seed in a heap, to hasten the decay of the hard outer coat. This process is known to the nurseryman as "stratifying."

STRATIOTES. (Water Soldier.)

The only species (*ord.* Hydrocharideæ) is a native aquatic, and grows so freely that in ornamental waters it frequently becomes a nuisance. It propagates freely by seeds or division, and is quite capable of taking care of itself. When first introduced to a pond or lake it should have a little soil or moss bound round its roots.

Principal Species :—

aloides, 1′ to 2′, Je., wh.

STRAWBERRY.

Description.—This delicious fruit (*ord.* Rosaceæ), is by far the most important of the small, soft fruits. Hundreds of acres of land are under Strawberries for the supply of the big markets, while many thousands of plants are grown in pots for the production of early fruits. Correctly, the delicious pulpy mass which is popularly regarded as the fruit of the plant is not the fruit at all, the small, light coloured specks (achenes) embedded in the surface of the flesh being the true fruits. The Strawberry is reputed to be excellent in cases of gout. It is certainly a most wholesome fruit, which can be partaken of in practically unlimited quantities, as no acetous fermentation is set up, as is the case with all other fruits except Raspberries.

Soil and Situation.—Broadly speaking, Strawberries will grow in any soil, but the varieties are fastidious, and one which thrives magnificently in one place will fail in another, and the reverse. Again, in some lands annual beds are the only ones that can be made profitable. With these reservations, the ideal soil is a deeply worked, friable, mellow loam, which has been enriched with manure if in poor condition. Neither very heavy nor very light soils are suitable. With the former gritty matter must be freely incorporated to give the necessary porosity, and into the latter clay should be mixed to afford retentiveness. If there be choice of situation, avoid that in which water may lodge, and if such must be employed, draining should be resorted to. There should be no obstruction to light and fresh air, the finest flavour being developed in full sun. In order to maintain a long supply of fruit, endeavour should be made to have plants on a warm, south border for earliness, in the open for successional and main crops, and on a north slope or border for the latest supplies.

Propagation.—By seeds for new varieties; by division, retaining one crown to each portion; and by runners, of which most varieties produce an abundance. The last-named method is the best. The utmost care should be taken to avoid runners from barren plants, as the progeny from such are almost invariably unfruitful. As a rule only the first plant produced by a runner should be secured, but where the second is very vigorous, or the stock is limited, this and others may also be secured. Three systems of procedure are open

Stravadium insigne (*see Barringtonia samöensis*).
Strawberry Blite (*see Blitum*).
Strawberry Spinach (*see Blitum*).
Strawberry Tree (*see Arbutus*).

for adoption: (1) layering the runners on to small squares of turf, half plunged grass side downwards in the soil; (2) layering into 3″ pots of light soil, these also being half plunged; and (3) layering into the natural soil after this has been loosened and, if dry, thoroughly watered. In all cases alternate spaces between the rows alone should be used, as the space containing no young plants may then form the alley for the operator to gather fruit and water the young plants, which is absolutely necessary in dry soils and seasons. For plants intended for forcing, either the first or second winter. The best time is the second half of July and the first week in August. For strong growing varieties in rich soil, have the rows 3′ apart, and the plants 18″ asunder in the rows. For medium growers the rows may be 2′ 6″ and the plants 15″ apart. In the second year alternate plants in the rows may be removed. Discretion must be used in this respect. In planting, as much care should be taken to spread out the roots as is given to Apples and Pears. Young, strong stock planted in October may carry a few fruits the first year, but it is a better plan not to allow them to do so. Small

Photo: Cassell & Company, Ltd.

STRAWBERRY MENTMORE (*see p.* 369).

mode should be chosen. Turves have the advantage over pots in one respect only. If when the small pots become full of roots repotting is not at once done, the roots form a perfect mat round the sides, with the result that when placed in larger pots root action may be some time before it recommences. Such an occurrence could not be with turves. The earlier that well-rooted runners from one year old plants can be had the better, especially when forcing is in view. In pots and turves the young plants should be well rooted in three weeks, but to ensure this the soil must be kept moist.

Preparing the Beds, and Planting.—The deeper the ground can be worked the better, and the subsoil should always be well loosened. As the soil is dug, thoroughly decomposed manure should be incorporated, the dressing being more generous on light, poor lands than on those that are in good condition. Planting ought to be done the moment the runners are well rooted, so as to give the young stock ample time to become established before plants put 6″ apart in nursery beds in October may be put into the permanent quarters in March, but must not be allowed to fruit.

Age of Beds.—The age at which the plants bear the most profitable crops varies with the variety in a slight degree, and with the soil and climate very considerably. Beds have been known to crop abundantly for seven years, or even more, but as a rule after three years the plants commence to deteriorate. In the first and second years the fruits are large and fine, and in the third year there come the bulk, with some fine specimens. To maintain a constant succession of beds in full vigour a certain number of rows must be annually destroyed, and a similar number planted with young, healthy stock. In those places where one year old plants give the best returns complete new Strawberry quarters are made up each year.

Routine Management. — Early in the year, when the flower spikes appear, long litter should be spread between the rows. It will quickly

become clean, and will then serve as a sweet bed upon which the developing fruits may rest and thus be kept clean. Forked twigs and even string are occasionally employed for this purpose, but straw is the best. With very dry weather at this period thorough waterings with clear water and liquid manure are necessary, repeating at intervals. Manure should not be given after the fruits are half swollen. Thinning of the fruits may be resorted to when specially fine specimens are required. The beds must be protected from birds by carefully netting them, or vast numbers of fruits will be destroyed. For dessert fruit a convenient length of stalk should be retained in gathering. When the crop is harvested all weeds, superfluous runners, large old leaves, and the remains of the long litter should be at once removed, and, if necessary, the surface soil may be lightly forked over. Some light, rich soil should be placed about the crowns in winter, and dressings of good farmyard manure may be applied. Where this is not forthcoming soot will be found of great value, as also will nitrate of soda applied in the spring; the latter should not be put on the plants.

Alpine Strawberries.—These may be grown either from seeds or runners, the former being the better system. If the seeds are sown as soon as ripe the seedlings quickly appear, and when they have made four leaves should be planted in beds; the rows should be 12″ apart, and the plants a similar distance asunder in the rows. If the beds are mulched in autumn with decayed manure and leaves, the plants will bear well the following year.

Strawberries for Preserving.—In many cases the small fruits from the ordinary beds are utilised for this purpose, but almost all the best varieties are unsuitable, as the fruits go to a pulp in boiling. Vicomtesse Héricart de Thury (*syn.* Garibaldi) is one of the few that retains its form. Where large quantities of fruit are required they should be specially grown, the best varieties being Grove End Scarlet and Roseberry. The plants should be placed 9″ apart in beds 4′ wide, and be allowed to spread over the entire surface of the beds, as the leaves will then form a clean bed for the fruit. The plants bear very freely, and the fruit does not smash.

Perpetual Fruiting Strawberries.—This is comparatively a new race, which has been raised by French growers. Its chief merit lies in very late fruiting, when the superior, larger fruiting varieties are over. Propagation is by runners as with other Strawberries, but care must be taken to pick out the very early flowers, or the plants will never become properly established. The best varieties at present are St. Antoine de Padoue and St. Joseph, and both may be grown either in the open ground or in pots.

Strawberries in Pots.—Five- and six-inch pots are employed, the former for the very early and the latter for successional varieties. A compost of turfy loam pulled to pieces, and one-fifth of decayed manure with some soot and wood ashes, is excellent, and the pots must be clean and well drained. Runners may be layered directly into these in summer, but though one potting is saved the system is not generally adopted, as the large bulk of soil destitute of roots is liable to become sour through constant waterings. After potting the pots are best on ash beds, where the crowns will become thoroughly ripened, and watering can be conveniently attended to. Only one crown is desirable, and all buds springing from the sides must be removed. Very early plants may be plunged in cold frames in November, the lights being on during heavy rains, snow, or frosts. Later batches can have the pots banked up with ashes, and have light litter scattered over them in severe weather. For fruiting, the plants may be placed on shelves in vineries, greenhouses, or other structures, but they must be near the glass, and in such a position that air can have access to them. Where large quantities of plants are grown lean-to houses with a movable step stage should be provided. The maximum night temperature at the commencement of early forcing should be 45°, and the day temperature 10° to 15° higher. This may be gradually increased until, with the ripening fruit, 75° with full ventilation may be allowed. An abundance of fresh air is requisite at all periods, and syringing must be done morning and evening in fine weather until the plants are in flower. Watering and feeding must be carefully attended to; the soil must never be allowed to become dry, but less water will be required when the early fruits are colouring. Mildew must be guarded against by care in ventilation, avoiding a close, stagnant atmosphere at all times. If it appear, dust the plants with flowers of sulphur. In case of aphides, apply tobacco powder. Red spider will attack indoor plants unless syringing and watering be regularly attended to.

Selections of Varieties:—

For General Use:—

Countess.	Monarch.
Dr. Hogg.	Newton Seedling.
Elton Pine.	President.
Gunton Park.	Royal Sovereign.
Latest of All.	Sir Joseph Paxton.
Lord Suffield.	Vicomtesse Héricart de Thury (Garibaldi).
Louis Gauthier.	Waterloo.
Mentmore (*see p.* 368).	

For Forcing:—

Royal Sovereign Vicomtesse Héricart de Thury	Very early.
Keens' Seedling La Grosse Sucrée	Second early.
Auguste Nicaise Dr. Hogg	Late forcing.

STREBLORRHIZA.

Speciosa, a half-hardy climbing shrub, is the only known species (*ord.* Leguminosæ). It grows 3′ to 4′ in height, and bears flesh coloured blossoms in May. Propagation, by seeds. Soil, fibrous loam and leaf mould.

STREBLUS.

A small genus (*ord.* Urticaceæ). Two species, asper and mitis, are known. They form small trees 20′ high, bearing alternate, deciduous leaves and minute flowers. Neither is worthy of cultivation.

STRELITZIA.

An interesting genus (*ord.* Scitamineæ) of ornamental, warm greenhouse, evergreen herbs. The flowers are peculiar by reason of their shape and colouring. The dwarf species have usually orange and purple flowers, borne in one-sided racemes on stalks 3′ to 4′ high, while augusta has white and blue flowers crowded together on stalks which barely rise above the leaf sheaths. Propagation, by seeds, rarely by division. Soil, good fibrous loam, with plenty of grit and pieces of stone or brick rubbish to keep it open. The best results

are obtained by planting out in a sunny position in a well-drained border. A minimum temperature of 50° should be given.

Only Species and Select Varieties :—

augusta, 20′, spr., sum., wh., pur.
Nicolai, 20′, spr., sum., wh., bl., near augusta.
parvifolia, 2½′, spr., or. yel., pur.
— juncea, lvs. Rush-like (*syn.* juncea).
Reginæ, 3′ to 4′, spr., or., bl. Bird of Paradise Flower.
— citrina, pale yel., bl.
— farinosa, wh. powdered (*syn.* farinosa).
— ovata, oval leaved (*syn.* ovata).

STREPTANTHERA.

Dwarf, bulbous plants (*ord.* Irideæ), suitable for a sunny greenhouse. Propagation, by offsets. Soil, sandy loam. A decided rest, with no water after the leaves have died, is necessary.

Principal Species :—

cuprea, 9″, Je., coppery yel.
elegans, 6″, My., wh., bl.

STREPTANTHUS.

Hardy annual or perennial herbs (*ord.* Cruciferæ), usually with purple, sometimes with white or yellow, flowers. Propagation, by seeds, sown in April, where the plants are to bloom, for the annuals; and seeds and root division for the perennials. The two species named below, which are probably the only ones in cultivation, are both annuals.

Principal Species :—

hyacinthoides, 2′ to 3′, Sep., deep bluish pur.
maculatus, 1½′ to 2′, Aug., pur. (*syn.* obtusifolius of *Botanical Magazine* 3317).

STREPTOCALYX.

Stove evergreens (*ord.* Bromeliaceæ), allied to and requiring the same treatment as Æchmea and Bromelia. A few species only are known, and those are very rarely seen.

Principal Species :—

Fuerstenbergii, 1½′, Oct., pk.
Vallerandi, 2′, aut., vio., red bracts.

STREPTOCARPUS.

Description.—This genus (*ord.* Gesneraceæ) of greenhouse and stove herbaceous perennials has become of importance during the past few years. Prior to the advent of the hybrids the plants were not largely grown, but the work of improvement commenced at Kew has been very successful, and the Streptocarpus is now a genus of many splendid forms.

Propagation.—By seeds sown in gentle warmth in spring, and subsequently pricked off and potted as becomes necessary. The young plants should be grown as sturdily as possible. Increase may also be done by division, but better plants are obtained from leaf cuttings.

Soil.—Medium, mellow loam, with a little leaf mould and coarse sand.

Other Cultural Points.—In the young state particularly the utmost care must be taken that the soil does not become dry, and that cold draughts do not reach the plants. Either of these errors will inevitably lead to failure. In the early stages gentle heat is desirable. The plants will flower profusely the second season, and are then useful for greenhouse and conservatory decoration, where the cooler, drier temperature conduces to prolonged floriferousness.

Principal Species :—

Dunnii, 1¼′, Je., rosy red.
Galpini, mauve, wh.
polyanthus, 1¼′, sum., pale bl.
Rexii, 6″, Je., bl.
Saundersii, 1′, sum., light bl.
Wendlandii, 2½′, spr., bl.

Principal Hybrids :—

achimeniflorus (Veitchs' vars. × polyantha).
Dyeri (Rexii × Wendlandii), 1½′, spr., bl.
gratus (Dunnii × Veitchs' vars.), 9″, sum., rosy pur.
Greenii (Rexii × Saundersii), 1½′, Aug., pale lil., bl.
kewensis (Dunnii × Rexii), 1′, aut., win., mauve, pur.
Mrs. Heal (Veitchs' vars. × Wendlandii), 1¼′, Aug., bright bl.
pulchellus (Veitchs' vars. × Fanninii), 1′, sum., bl., wh., rosy shades.
Watsoni (Dunnii × parviflora), 1′, sum., aut., rosy pur.

Other Species :—

caulescens, sum., lil.
Fanninii, bl.
Kirkii, sum., st., lil.
parviflorus, small, bl.

A Streptocarpus from seed.

STREPTOPUS.

Hardy or half-hardy herbaceous perennials (*ord.* Liliaceæ), with creeping roots. Propagation, by division in spring. Any good garden soil.

Principal Species :—

distortus, 1′, My., grn., wh.
roseus, 1½′, Je., pk.
simplex, 1½′, Je., wh. (*syn.* candidus).

STREPTOSOLEN.

Description.—An evergreen greenhouse shrubby plant (*ord.* Solanaceæ). The deep orange coloured flowers are freely produced in terminal heads For a warm conservatory it is a fine subject, flowering over a long period, but most profusely in spring and summer.

Propagation.—By cuttings, in sandy soil, in a warm pit, under a bell-glass.

Soil.—Light loam and leaf soil in equal parts, with a little dried cow manure and plenty of coarse sand.

Other Cultural Points.—A warm greenhouse suits this plant well, as it enables the cultivator to maintain a moister atmosphere than if a cool house is provided. Under such conditions red spider is easily kept at bay, whereas a dry atmosphere encourages this pest, which will quickly destroy the beauty and health of the finest specimens. Just previous to and during flowering, occasional supplies of liquid cow manure wi assist the plants. During the summer no protection need be given, except to young stock. Large specimens look well in flower garden arrangements, and are so used in many large public parks.

Only Species :—

Jamesoni, 6′, spr., sum., or. red (*syn.* Browallia Jamesoni).

STRICKLANDIA.

A stove bulb (*ord.* Amaryllideæ), allied to Stenomesson and Eucharis, with umbels of red flowers, produced in advance of the two leaves. Propagation, by offsets. Soil, fibrous mellow loam, with a third of peat and a good sprinkling of sand. Good drainage and firm potting are necessary. After the leaves die down, the bulbs should be kept dry and rested till the flower scape appears. Plenty of moisture overhead and at the roots is necessary during growth. Repot during the resting period when necessary.

Only Species : —

eucrosioides, 1′, spr., deep red (*syns.* Leperiza eucrosioides and Stenomesson Stricklandi).

STROBILANTHES.

Stove and warm greenhouse shrubs (*ord.* Acanthaceæ), of easy culture, valued chiefly for late autumn and winter flowering. Propagation, by cuttings in spring and summer, in sand, under a bell-glass or in a close case. Soil, equal parts of fibrous loam and peat, with sand. Dyerianus is a fine foliage plant, the young leaves being rich rosy purple on a dark green ground ; also occasionally used as a bedding plant.

Principal Species :—

alatus, 3′, vio., bl. (*syn.* attenuatus).
anisophyllus, 3′, Je., lavender (*syns.* Goldfussia and Ruellia anisophylla and R. persicæfolia).
callosus, 2′, My., bl. (*syn.* Ruellia callosa).
dyerianus, 1′ to 4′, aut., vio. bl.
glomeratus speciosus, 2′ to 5′, Nov., pur. (*syn.* Goldfussia glomerata speciosa); brighter than the type.
gossypinus, 1′ to 4′, Mch., Ap., lil.
isophyllus, 2′, win., lavender (*syn.* Goldfussia isophylla).
sabinianus, 4′, Mch., bluish pur. (*syn.* Ruellia sabiniana).
Wallichii, 6″ to 24″, Oct., bl. (*syn.* Goldfussia Thomsoni).

Other Species :—

coloratus, 2′, lil., pur., lvs. pur. beneath.
flaccidifolius, 1½′ to 3′, Dec. to Feb., bluish pur. ; yields a bl. dye.
maculatus, 1½′, Sep., lil.
scaber, 3′, My., yel. (*syn.* Ruellia scabra).

STROMANTHE.

Stove evergreen herbs (*ord.* Scitamineæ). Propagation, by seeds when obtainable, and by division before growth commences. Soil, loam, peat, leaf mould, and sand.

Principal Species :—

amabilis, bracts red.
lubbersiana, lvs. variegated, yellowish grn.
streaks (now Myrosma Lubbersii).
porteana, bracts coloured, lvs. grn.

STROPHANTHUS.

Stove shrubs and climbers (*ord.* Apocynaceæ), with showy flowers. Propagation, by cuttings getting firm at the base, in sand, under a bell-glass, in bottom heat. Soil, equal parts loam and peat, with sand. Plenty of moisture is needed when making growth.

Principal Species :—

bullenianus, ev., yellowish pur.
capensis, ev., or. yel.
dichotomus, 3′, Je., ev., ro.
Ledienii, yel., pur. throat.
petersianus grandiflorus, cl., red, yel.
sarmentosus, 6′, Je., red.

STROPHOLIRION (*syn.* RUPALLEYA).

The only species (*ord.* Liliaceæ) is a charming hardy or half-hardy bulbous plant, which has been already referred to under Brodiæa volubilis. It may be treated like the Brodiæas, but it is correctly a Strophólirion.

Only Species :—

californicum, scape 10′ to 12′, Jy., twining, ro. (*syn.* Brodiæa volubilis).

STRUMARIA.

A small genus of greenhouse bulbs (*ord.* Amaryllideæ), allied to Nerine and Hessea. Propagation, by seeds, and by offsets when repotting. Soil, good fibrous loam, with a third of leaf mould, well-rotted cow manure, and sand. The bulbs should be thoroughly dried when at rest in a frame exposed to sunshine. The leaves are produced contemporaneously with the flowers, and a copious supply of water should be given at that period. Several species are now referred to Hessea.

Principal Species :—

angustifolia, 6″ to 12″, Ap., pk.
linguæfolia (*see* truncata var.).
rubella, 1′ to 1½′, My., pk.
spiralis (now Carpolysa spiralis).
truncata, 6′ to 12′, Ap., pk.
— linguæfolia, more robust, flowers larger.
undulata, 8″ to 18″, My., pk.

STRUTHIOLA.

Greenhouse shrubs and sub-shrubs (*ord.* Thymelæaceæ), of Heath-like habit. Propagation, by short side shoots in sand, under a bell-glass, in spring. Soil, equal parts loam and peat, with plenty of sand.

Principal Species :—

angustifolia, 6″ to 12″, Ap., pk.
linariloba, 2′, Je., wh. (*syn.* juniperina).
longiflora, 2′, Jy., yel.
stricta, 1½′, Je., wh. (*syn.* erecta of Curtis).
virgata, 2′, Je., red (*syns.* ciliata of Andrews' Repertory t. 149, and pubescens of Retzius).

STRUTHIOPTERIS (*see* ONOCLEA).

STRYCHNOS.

Stove climbers, and evergreen trees and shrubs (*ord.* Loganiaceæ). The bark and seeds of several species furnish strychnine. Nux-vomica is the most noted, but is of no garden value.

Stringy Bark Tree (*see Eucalyptus*).
Striped King of the Woods (*Zeuxine regia*).
Strobilorhachis (*see Aphelandra*).

Strychnodaphne (*see Ocotea*).

STRYPHNODENDRON.

Small stove trees (*ord.* Leguminosæ), allied to Adenanthera, and seldom cultivated. Propagation, by seeds when obtainable, and by cuttings of half-ripened wood in sand, under a bell-glass, in bottom heat. Soil, loam, peat, and sand. Guianense (*syns.* Acacia, Mimosa, and Piptadenia guianensis), 30′ to 40′, November, white, is the only introduction.

STUARTIA.

A small genus of hardy but much neglected shrubs (*ord.* Ternstrœmiaceæ), with large and handsome white flowers resembling single Camellias. Propagation, by seeds, and by layers in autumn. Soil, moist sandy loam; if at all dry a liberal admixture of peat must be given. On soil of the green sand formation, where moisture is ample at all seasons, they succeed well.

Principal Species :—

pentagyna, 6′ to 10′, sum., cream (*syns.* ovata and Malachodendron ovatum).
pseudo-camellia, 6′ to 12′, sum., creamy wh. (*syns.* grandiflora and japonica).
virginica, 5′ to 8′, Ap., wh. (*syns.* Stuartia Malachodendron and marylandica).

STYLIDIUM.

Greenhouse herbs, rarely shrubs (*ord.* Stylidieæ), with narrow leaves and small flowers remarkable for their sensitive styles. Propagation, by seeds; the herbs also by division, and the shrubs by cuttings under a bell-glass, in sand. Soil, mellow, fibrous loam, with peat, leaf mould, and sand.

Principal Species :—

adnatum, 6′, Jy., herb, pk.
bulbiferum, 6″ to 8″, My., pk. (*syn.* recurvum of *Botanical Magazine* 3913).
crassifolium, 9″ to 12″, Je., lil.
dichotomum, 6′, Aug., herb, yel. (*syns.* Hookeri and mucronifolium).
glandulosum, 1½′, Jy., shr., pk. (*syn.* fruticosum).
graminifolium, 1′, Jy., herb, pk. Armeria is a ro. var.
lineare, 1′, Je., red.
spathulatum, 6″ to 8″, Je., pale yel. (*syn.* bellidifolium).

STYLOCORYNA.

Stove evergreen shrubs (*ord.* Rubiaceæ), few of which are cultivated. Propagation, by cuttings in sand, in a close case. Soil, equal parts loam and peat, with sand. Coriacea, 4′, stove, white, is in cultivation, and should be treated like Gardenias. Corymbosa is now Olostyla corymbosa.

STYLOPHORUM.

Hardy herbaceous perennials (*ord.* Papaveraceæ), useful in the border. Propagation, by seeds, and division of the roots in spring. Well-drained garden soil.

Principal Species :—

diphyllum, 9″, Je., yel. (*syns.* ohioense, petiolatum, Chelidonium diphyllum, Meconopsis diphylla, and M. petiolata).
japonicum, 1½′, My., yel. (*syn.* Chelidonium japonicum).

STYPANDRA.

Greenhouse plants (*ord.* Liliaceæ), allied to Dianella. Propagation, by division in spring. Soil, fibrous peat and loam, with coarse sand.

Principal Species :—

cæspitosa, 1½′, Je., bluish yel., sometimes wh.
glauca, 2′, Je., bl. (*syns.* frutescens and propinqua).
umbellata, 9″, Je., wh or yel.

STYPHELIA.

Greenhouse evergreens (*ord.* Epacrideæ). Propagation, by cuttings in sandy peat, beneath a bell-glass, over gentle heat. Soil, fibrous peat, a little loam, and some coarse sand.

Principal Species :—

longifolia, 3′, Je., grn.
triflora, 5′, Jy., pk., yel.
tubiflora, 5′, Jy., sc.
viridis, 3½′, My., grn. (*syn.* viridiflora).

STYRAX.

Deciduous, hardy, or warm greenhouse shrubs (*ord.* Styraceæ), some of great beauty when in flower. Many of the species are of economic value, the benzoin resin coming from the species of that name, while storax, a balsamic resin, is derived from officinale. Propagation, by cuttings, by layers either in spring or autumn, and by imported seeds sown as soon as received in a warm greenhouse. Soil, light loam, with leaf mould, for the hardy species; a mixture of fibrous loam, peat, and coarse sand for the tender ones.

Principal Species :—

americanum, 6′, sum., hdy., wh. (*syn.* Halesia parviflora of Lindley).
Benzoin, 6′, sum., warm grh. or st., wh.
japonicum, 10′, spr., hdy., wh., buds pk.
Obassia, 12′ to 20′, Je., hdy., wh.
officinale, 10′, Jy., grh. in cold districts, wh.

Other Species :—

californicum, 8′, sum., wh.
grandifolium, 6′, spr., wh.
pulverulentum, 4′, Je., wh. (*syn.* lævigatum).
serrulatum, 10′ to 40′, spr., wh.

SUCCULENTS.

Under this general head may be grouped all those plants possessing thick fleshy leaves and stems. Succulents have comparatively few roots, hence they do not become gorged with moisture during a rainy season. On the other hand, they also have thick skins on the leaves and stems, and few stomata; hence even in the hottest and driest times they give off little moisture. The majority of Cacti are succulents, and among these the most familiar genera are Cereus, Echinocactus, Epiphyllum, Mammillaria, Melocactus, Opuntia, and Phyllocactus. In the natural order Liliaceæ there are numerous succulents, notably in the genera Aloe, Gasteria, and Haworthia, while among Amaryllids the extensive genus Agave is remarkable for its succulent species. Some other orders are also well represented among succulents, the best known genera being Cotyledon, Crassula, Sedum, and Sempervivum (Crassulaceæ) and Mesembryanthemum (Ficoideæ).

SULPHUR.

As one of the ten essential elements which go to build up the plant, sulphur plays a highly important part in the vegetable world. It is always found in protoplasm, although its exact uses are not defined. Probably the name sulphur suggests to the gardener more vividly than anything else a very useful and handy fungicide. Flowers of

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Stylandra (*see Podostigma*).
Stylolepis (*see Podolepis*).

Styphnolobium (*see Sophora*).
Sugar Cane (*see Saccharum officinarum*).
Sugerokia (*see Helmiopsis*).
Sukana (*see Celosia*).

sulphur dusted upon shoots and leaves affected with parasitic fungi (*e.g.* mildews) is effective in checking the progress of the pest. A small hand bellows or distributor should be used in dusting the affected parts. A little flowers of sulphur placed in the water with which pot Roses and Vines are syringed is an excellent preventive against mildew, and not a few eminent growers put this method into practice. Sulphur may also be worked into winter dressings for Vines and other fruit trees, in company with petroleum, Gishurst Compound, etc. Burning flowers of sulphur in Melon and Cucumber houses speedily rids them of lurking insect and fungoid pests, and is to be recommended, but it is deadly to growing plants. (*See also* FUNGICIDES and FUMIGATING.)

SUNFLOWER (*see* HELIANTHUS).

SUPERPHOSPHATES.

Superphosphates, either mineral or bone, constitute one of the most valuable "artificial" plant foods, as there is scarcely a crop to which they will not prove beneficial. "Super," as it is commonly termed, can be applied at practically any period of the year, but generally speaking it proves most valuable when applied early in spring. It is the base of the majority of the specially mixed manures, and is included in all mixtures recommended for kitchen garden crops. Whatever form of super is employed, it must be remembered that its whole value lies in the amount of soluble phosphate, and that which gives the highest guaranteed percentage will be the cheapest. Mineral superphosphate is most commonly used, and it should be received in a dry condition. The amount of application varies to a degree upon the different soils and the various crops, but for a spring dressing, to be worked into soil in which there is a known deficiency of lime, 7 lb. per square rod may be advantageously given. The super should be kept from the leaves of the plants, or they are liable to become burned. (For the use of super in association with other manures, *see* the various fruit and vegetable garden crops; also ARTIFICIALS.)

SUSUM.

The only notable member of this genus (*ord.* Flagellarieæ) is anthelminthicum, whose little horticultural value lies in the Dracæna-like, reddish leafage. Stove treatment and well-drained loam are essential.

SUTHERLANDIA.

Half-hardy or greenhouse shrubs (*ord.* Leguminosæ). Propagation, by seeds, or cuttings of young shoots. Light, loamy soil.

Principal Species :—

frutescens (?), 3′ to 5′, Je., se. (*syn.* Colutea frutescens). Cape Bladder Senna. Canescens and obcordata are vars.

Sumach (*see Rhus*).
Summer Snowflake (*see Leucojum æstivum*).
Sundew (*see Drosera*).
Sunfruit (*see Heliocarpus*).
Sunplant (*see Portulaca grandiflora*).
Sunrose (*see Helianthemum*).
Susarium (*see Symphostemon*).
Sutera (*of Roth, see Chænostoma*).
Swarrow Nut (*see Caryocar*).

SWAINSONA.

Evergreen shrubs or sub-shrubs (*ord.* Leguminosæ), growing best in the greenhouse. There are several species, but very few are of acknowledged horticultural value. Propagation, by cuttings beneath a bell-glass in summer, or by seeds sown when ripe or in spring after being soaked. Soil, three parts of fibrous loam and one part of fibrous peat, with coarse sand.

Principal Species and Varieties :—

coronillifolia, 4′, Jy., light rosy pur. (*syn.* Osbornii).
— galegæfolia, 6′, sum., deep reddish pur.
— galegæfolia alba, 6′, sum., pure wh.
greyana, 3′, Jy., pk.

Photo : Cassell & Company, Ltd.

SWEET PEA MISS WILLMOTT (*see p.* 375).

Other Species :—

canescens, 2′, Je., vio. pur. (*syn.* Cyclogyne canescens).
lessertiæfolia, 2′, Jy., pur.
procumbens, 1′, sum., pur. (*syn.* violacea).

SWARTZIA.

Evergreen stove shrubs (*ord.* Leguminosæ). Propagation, by cuttings of half-ripened wood, in very

Swallowwort (*see Asclepias and Chelidonium*).
Swammerdamia (*see Helichrysum*).
Swamp Dogwood (*Ptelea trifoliata*).
Swamp Hickory (*Carya amara*).

sandy soil, beneath a bell-glass, over bottom heat. Soil, peat and loam, both fibrous, and sharp sand.

Principal Species :—

grandiflora, 6′, sum., yel. (*syn.* simplicifolia).
pinnata, 6′, Jy., yel.

SWEEPING.

Besoms made of Birch or Heather are generally used in garden sweeping, and are the best tools for the purpose, though the ordinary bass stable broom is often useful in narrow walks, and the sweeping machine on lawns and other large areas. In sweeping walks a light, swishing motion should be imparted to the broom, keeping loose gravel well up in the centre of the walk, and always picking up the accumulations before their size threatens danger to the broom or the surface of the walk. Much labour is expended unnecessarily by not observing the direction of the wind before commencing.

Swamp Laurel (*Magnolia glauca*).
Swamp Lily, Peruvian (*see Zephyranthes candida*).
Swamp Locust Tree (*Gleditschia monosperma*).
Swamp Oak (*Quercus lyrata*).
Swamp Rose Mallow (*Hibiscus Moscheutos*).
Swamp Sassafras (*Magnolia glauca*).
Swamp Saxifrage (*Saxifraga pennsylvanica*).
Swamp White Oak (*see Quercus bicolor*).
Swan-neck Orchid (*see Cycnoches*).
Swan River Daisy (*see Brachycome*).
Swan-wort (*see Cycnoches*).
Swedish Beam Tree (*Pyrus intermedia*).
Swedish Juniper (*Juniperus communis fastigiata*).
Sweet Acorn Oak (*Quercus Ballota*).
Sweet Alyssum (*see Alyssum maritimum*).
Sweet Amber (*see Hypericum Androsæmum*).

SWEET PEA.

Description.—The hardy Lathyrus odoratus (*ord.* Leguminosæ) is one of the most valuable of summer flowering annuals, and with the improvement that is being made in the varieties it is becoming more and more popular. It can be grown in almost any garden, and there is no plant which will give, with proper attention, an equal number of beautiful flowers for cutting. In addition to lovely colours the blooms have the advantage of being delightfully fragrant.

Propagation.—Sweet Peas are almost exclusively raised from seeds, though the tops of young plants made into cuttings will root readily in a greenhouse or frame. Seeds may be sown in the open in March or April, either in rows or clumps, or in pots or boxes in February. The latter system should be adopted where possible, the seeds being placed 1½″ or 2″ asunder in boxes 24″ long, 5″ wide, and 5″ deep; or they may be sown at the rate of six seeds to a 6″ pot, not putting any in the centre. Stand the receptacles in a cold frame or greenhouse,

Photo : Cassell & Company, Ltd.

Cupid Sweet Peas in Pots (*see p.* 375).

Sweet Basil (*see Basil and Ocimum*).
Sweet Bay (*see Laurus nobilis*).
Sweet Brier (*see Rosa rubiginosa*).
Sweet Calabash (*Passiflora maliformis*).
Sweet Cassava (*Manihot Aipi*).
Sweet Chestnut (*see Castanea sativa*).
Sweet Cicely (*Chærophyllum aromaticum and Myrrhis odorata*).
Sweet Flag (*see Acorus Calamus*).
Sweet Gale (*see Myrica Gale*).
Sweet Gum (*see Liquidambar styraciflua*).
Sweet Lime (*see Citrus medica Limetta*).
Sweet Marjorum (*see Origanum*).
Sweet Maudlin (*Achillea Ageratum*).
Sweet Orange (*see Citrus Aurantium*).

admitting abundance of air, and as soon as germination has taken place raise the plants so that they are close to the glass, or they become drawn and weakly. The plants should have twigs placed to them when they have attained a height of 6″. From seeds sown in February plants in fine condition for planting when the soil and climate are favourable in April will be raised.

Soil.—The best soil is a deeply worked, friable, retentive loam, but excellent results may be ensured on any soil where care in preparation is exercised. The ground should be trenched or bastard trenched according to the nature of the subsoil, and with the second spit should be incorporated some good farmyard manure. Short, decomposed manure may be mixed with the upper soil as this is worked back.

Planting.—If several rows are to be planted they should be 5′ to 6′ asunder, but if the plants are in clumps let these be 4′ apart all ways. The plants should be carefully turned out of the pots or boxes, the roots being disentangled, retaining as much soil about them as possible, and planted from 4″ to 6″ apart, staking immediately planting is complete. The surface soil should be lightly dressed with soot or lime, either of which will act as a deterrent of slugs. Where the plants are grown wholly out of doors they must be protected from birds as well as slugs.

Feeding.—Where a good quantity of farmyard manure is not available, more feeding of the plants is a necessity. Science says that Leguminous plants do not require the artificial application of nitrogen, but practice proves that the results are improved by its use, especially in spring and in the early stages of growth. Nitrate of soda at the rate of ½ oz. to 1 gallon of water is valuable, and the same may be said of soot water used at the colour of weak tea; as a change from these, liquid manure made from natural manures of any kind can be employed. If specially fine blooms for exhibition are required, the number on a plant should be restricted. The closer the gathering of the flowers, the longer will the plants continue to bloom.

Selection of Thirty-six Varieties:—

America, blood redstriped.
Black Knight, maroon.
Blanche Burpee, wh., large.
Captain of the Blues, bl.
Captivation, magenta.
Coccinea, red.
Countess of Powis, or.
Dorothy Tennant, mauve.
Duchess of Sutherland, blush pk.
Duchess of York, wh., striped pinkish pur.
Duke of Clarence, claret.
Firefly, crim.
Gaiety, wh., rosy lil., striped.
Golden Gate, lavender pk.
Gorgeous, or. salmon.
Grey Friar, pur., wh. ground.
Her Majesty, rosy pk.
Katherine Tracy, pk.
Lady Grisel Hamilton, lavender.
Lady Mary Currie, or.
Lady Nina Balfour, lavender.
Lord Kenyon, rosy magenta.
Lottie Hutchins, creamy pk.
Mars, crim.
Miss Willmott, or. pk. (*see p.* 373).
Mrs. Eckford, yel.
Mrs. Joseph Chamberlain, wh., striped ro.
Navy Blue, dark bl.
Prima Donna, pk.
Prince Edward of York, rosy pk.
Princess of Wales, wh., striped pur.
Royal Robe, pk.
Sadie Burpee, wh.
Salopian, crim.
Senator, chocolate, cream.
Triumph, or.

Cupid Sweet Peas.—These dwarf-growing plants (*see p.* 374) may be grown and flowered in pots, or be raised in pots and planted in a border. The treatment is identical with that for Sweet Peas, save that no staking is requisite.

SWEET SULTAN (*see* CENTAUREA).

SWEET WILLIAM (*see* DIANTHUS).

SWERTIA. (Felwort.)

Hardy or half-hardy annual or perennial plants (*ord.* Gentianeæ). Propagation, by seeds sown over gentle heat in early spring; by division of the perennials in spring. Soil, sandy loam.

Principal Species:—

alata, 1½′, sum., hlf-hdy. ann., yellowish grn., pur. (*syn.* Ophelia alata).
corymbosa, 1′, sum., pale bl. or wh. and bl. (*syn.* Ophelia corymbosa).
perennis, 9″, Jy., hdy. per., bl.
trichotoma, 1½′, sum., hlf-hdy. ann. (*syn.* Ophelia umbellata).

Other Species:—

angustifolia, 2′, sum., wh., bl. (*syn.* Ophelia angustifolia).
michauxiana, 6″, sum., bien., greenish yel. (correctly Halenia schiedeana).
paniculata, 1′, sum., wh., pur. (*syn.* Ophelia paniculata).
purpurascens, 2′, Je., pur.

SWIETENIA.

A genus (*ord.* Meliaceæ) of little horticultural but of great economic value. The only species of note is Mahagoni, 10′ to 70′, May, red, yellow, the Tropical American tree that gives the beautiful timber Mahogany. Under cultivation in this country it needs stove treatment. Propagation, by cuttings of ripened growth, in sandy soil in heat. Soil, fibrous loam and sand.

SYCAMORE (*see* Acer Pseudo-platanus).

SYMPHORICARPUS. (Snowberry Tree, St. Peter's Wort.)

A genus of ornamental, hardy shrubs (*ord.* Caprifoliaceæ) valued in the shrubbery. Racemosus is of service on account of its fruits being useful as a food for game, and its flowers being frequented by bees. Propagation, by suckers, or by seeds sown when ripe, or in spring. Any good garden soil.

Principal Species:—

occidentalis, 6′, Jy., pk., fruits wh. (*syn.* Symphoria occidentalis). Wolf Berry.
racemosus, 6′, Jy., ro., fruits wh. (*syn.* Symphoria racemosa). Common Snowberry.

Sweet Pishamin (*see Carpodinus*).
Sweet Potato (*Batatas edulis and Ipomœa Batatas.*)
Sweet Scabious (*see Scabiosa atropurpurea*).
Sweet-scented Crab (*Pyrus coronaria*).
Sweet-scented Verbena (*see Lippia*).
Sweet Sop (*Anona squamosa*).
Swietenia (*see Chloroxylon*).
Sword Fern (*see Polypodium*).
Syagrus (*see Attalea and Cocos*).
Syama (*see Pupalia*).
Sycamine Tree (*see Morus*).
Sycamore Fig Tree (*Ficus Sycamorus*).
Sycomorus (*see Ficus*).
Symphonia (*see Moronobea*).

Other Species and Varieties :—

acutus, 4′ to 6′, sum., wh. or pk. (*syn.* mollis acutus).
Heyheri, 6′, sum., ro. (*syn.* occidentalis Heyheri).
orbiculatus, 3′ to 6′, Jy., wh., pk., fruits purplish red (*syns.* fructu rubro, glomeratus, parviflorus, vulgaris, and Symphoria glomerata). Common St. Peter's Wort, Coral Berry, Indian Currant.
— variegatus, lvs. variegated grn. and yel.
parviflora (*see* orbiculatus).
puniceus, 2′ to 4′, My., red (*syn.* Lonicera punicea of Sims, *Botanical Magazine* 2469).
racemosus pauciflorus, few flowered.
vulgaris (*see* orbiculatus).

SYMPHYANDRA.

Hardy perennials (*ord.* Campanulaceæ), differing from the Campanulas by the styles being united at the base. Propagation, by seeds, and pendula also by division. Common soil in a sunny position. Pendula likes partial shade, and looks best hanging over a stone.

Principal Species :—

armena, 2′, Je., per., bl.
Hofmanni, 1′, sum., bien., wh. (*syn.* Kaufmanni of gardens).
pendula, sum., per. trailer, creamy wh.
Wanneri, 6″, sum., bien., bl. (*syn.* Campanula Wanneri).

SYMPHYOSTEMON.

A genus of greenhouse, half-hardy, or hardy perennials (*ord.* Irideæ), practically unknown in gardens. Propagation, by seeds or division. Soil, sandy loam and leaf soil.

Only Species :—

acaulis, 3″, sum., bl.
narcissoides, 1½″, Je., pale yel. (*syns.* odoratissimus, Sisyrinchium narcissoides, Galaxia narcissoides, Gladiolus biflorus, and Solenomelus biflorus).
nigricans, 6″, yel.
Segethi, creeping hdy. per., bl. (*syn.* Susarium Segethi).

SYMPHYTUM. (Comfrey.)

A genus of about thirty species of hardy perennial herbs (*ord.* Borragineæ), generally better adapted for the wild garden than the select border. Those with variegated foliage are often admired. Propagation, by division in spring or autumn, and by seeds in spring. Common soil.

Principal Species and Varieties :—

asperrimum aureo-variegatum, lvs. bordered yel.
caucasicum, 3′, sum., bl.
officinale bohemicum, 1′ to 3′, Je., red (*syn.* bohemicum).
— luteo-marginatum, lvs. margined yel.

Other Species and Varieties :—

asperrimum, 4′, Je., bluish pur. Prickly Comfrey, Trottles.
Donii, 2′, sum., bl. (*syn.* caucasicum of D. Don, not caucasicum of Bieberstein).
officinale, 1′ to 3′, Je., creamy yel. Common Comfrey, Black Root, Alum, etc.
— album, wh.
— patens, pur.
orientale, 3′, Je., wh. or bl.
— angustior, lvs. oblong (*syn.* orientale of *Botanical Magazine* 1912).
peregrinum (*see* asperrimum).
tauricum, 3′, Je., wh.
tuberosum, 1′ to 2′, Je., yel.

SYMPIEZA.

A genus of about five species of small greenhouse shrubs (*ord.* Ericaceæ), with Heath-like flowers in clusters. Propagation, by cuttings under a bell-glass in sand. Soil, turfy peat and sand. Capitellata is a pleasing little plant.

Principal Species :—

capitellata, 1½′, Jy., pk.

SYMPLOCARPUS. (Skunk Cabbage.)

A monotypic genus (*ord.* Aroideæ). Propagation, by division. Moist, peaty soil in the bog garden.

Only Species :—

fœtidus, 1′, Feb., My., hdy. per., spathe purplish br., greenish yel., spadix vio. (*syns.* Dracontium fœtidum, Pothos fœtidus, and Spathyema fœtida).
kamtschaticus (now Lysichitum camtschatcense).

SYMPLOCOS.

A large, but little cultivated, genus of greenhouse or stove trees or shrubs (*ord.* Styraceæ). Propagation, by cuttings under a bell-glass in sand. Soil, good loam, with peat and a little sand.

Principal Species :—

coccinea, 10′, My., st., red.
cratægoides, 3′ to 40′, Ap., grh., wh.
japonica, 10′, Je., grh., pale yel. (*syn.* lucida of Siebold and Zuccarini).
sinica, 3′, My., grh., wh.
Sumuntia, 3′ to 5′, sum., st., wh.
tinctoria, 3′, Ap., grh., yel. Sweet Leaf, Horse Sugar.

SYNADENIUM. (African Milk Bush.)

Three species of rather succulent stove shrubs (*ord.* Euphorbiaceæ), with the female flowers solitary, and the male ones in flat heads of twenty or more. Propagation, by cuttings, allowed to callus before insertion in sand. Soil, sandy loam with a little thoroughly decayed cow manure or leaf mould.

Principal Species :—

Grantii, 6′ to 10′, Nov., reddish pur.

SYNANDRA.

A hardy biennial herb (*ord.* Labiatæ), of little value. Propagation, by seeds sown in spring or early summer. Common soil. Synandra of Schrader is Aphelandra.

Only Species :—

grandiflora, 1′ to 2′, Je., wh.

SYNANDROSPADIX.

A handsome tuberous stove plant (*ord.* Aroideæ), of comparatively recent introduction. Culture as for Anthuriums, which *see*.

Only Species :—

vermitoxicus, 1′, Oct., Mch., spathe greyish grn., flesh, spadix purplish.

SYNANTHERIAS.

A stove tuberous plant (*ord.* Aroideæ). Propagated by the bulbils from the tubers, or by division. Culture as for Amorphophallus, which *see*.

Only Species :—

sylvatica, My., st., spathe marked grn. and pk., spadix yel. (*syns.* Amorphophallus sylvaticus and A. zeylanicus, and Arum sylvaticum).

SYNECHANTHUS (*syns.* Rathea and Reineckia).

A genus of graceful and attractive stove Palms (*ord.* Palmæ), with small greenish or purplish flowers, and terminal pinnatisect leaves. Soil, two parts of fibrous peat, one part of sand, and one of loam, with shade and plenty of moisture.

Symphyoglossum (*see Cynanchum*).
Synaphlebium (*see Davallia and Lindsaya*).
Syneilesis (*see Senecio*).

Principal Species :—

fibrosus, 4′, lvs. about the same length, erect, spreading; rather pendulous leaflets.

SYNNOTIA.

Pretty greenhouse bulbous plants (*ord.* Irideæ). Propagation, by offsets, or by seeds sown when ripe

Photo : Cassell & Company, Ltd.

SYRINGA PERSICA (*see p.* 378).

SYNGONIUM.

A genus of about ten species of climbing stove shrubs (*ord.* Aroideæ). Propagation, by cuttings. Soil, sandy loam, leaf soil, or peat. No shading.

Principal Species and Varieties :—

affine, grn., yel. (*syn.* gracile).
auritum, pur., yel. Five Fingers.
podophyllum albo-lineatum, midrib and nerves of lvs. wh. (*syn.* Seemanni).
vellozianum, grn., yel.
— riedelianum, oblong tube.

in sandy soil. They produce flowering plants in three years or so. Pot in October in sandy loam, with peat or leaf soil, six in a 5″ pot, 1″ deep. Plunge in a frame from which frost is excluded. Dry off the bulbs gradually after flowering, and give a short period of rest before replanting.

Only Species and Variety :—

bicolor, 1′ to 1½′, Mch., yel., vio. (*syns.* galeata, Sparaxis bicolor, Gladiolus bicolor and G. galeatus).
— Roxburghii, lil. pur.,

bulb tunics of fine threads.
variegata, 1′, My., vio. yel. (*syn.* Sparaxis luteo-violacea and Wattii).

SYNTHYRIS.

Pretty, hardy, Alpine perennials (*ord.* Scrophularineæ), with spikes or racemes of small flowers. Propagation, by division or seeds. Common, moist soil. They look best on the rockery.

Principal Species :—

pinnatifida, 9″, sum., bl.
reniformis, 6″ to 10″, spr., bl., prettier than above.

SYRINGA.

Description. — Hardy, deciduous shrubs (*ord.* Oleaceæ) comprising the well-known, fragrant, and beautiful Lilacs (which *see*). Given an open position where they can have an abundance of air, there are few shrubs that produce a more attractive effect in spring.

Propagation.—By layers and rooted suckers; also by budding or grafting the choice varieties on to the common Lilac.

Soil.—Deep loam, but there is probably no soil in which good Lilacs may not be grown when proper attention is accorded.

Other Cultural Points.—The Lilac is so universally seen and so easily grown that the impression prevails that no attention need be given at any stage. The centre of young plants should be kept open by pruning regularly, and the growths springing from the base must be removed. The old flowers should be removed before seed is formed, and the young growths thinned.

Principal Species, Hybrid, and Varieties :—

[Note.—For special selections of varieties, *see* Lilac.]

chinensis, 4′ to 8′, My., vio., hybrid (*syns.* correlata, dubia, and rothomagensis); metensis, rubra, and saugeana are vars.
persica, 5′, My., pur. (*see p.* 377).
— alba, 3′, My., wh.
— laciniata, 5′, My., pur. (*syns.* filicifolia, laciniata, pteridifolia, and pinnata).
vulgaris, 8′ to 12′, My., vio.; many fine vars. (*see* Lilac).

Other Species and Varieties :—

Emodi, 9′, Ap., wh.; there are rose coloured and variegated leaved vars.
japonica, 20′, Jy., crim.; very large inflorescences.
Josikæa, 8′, My., lil.
— eximia, larger than type, ro.
oblata, 9′, pur. (*syn.* chinensis of Blume).
pekinensis, wh. (*syns.* amurensis pekinensis and Ligustrina pekinensis).
villosa, 6′, My., pur. (*syns.* pubescens and verrucosa).

SYRINGE.

A syringe with a plain nozzle should always be chosen in preference to one with a perforated cap. With the former it is possible by an intelligent manipulation of the index finger of the left or grasping hand to produce a spray of any required density, and to direct that spray on to any part of a plant desired. In using oily or soapy solutions a difficulty is often experienced in holding the syringe, but a small metal stop or flange, which can readily be soldered to the barrel by a mechanic, placed to afford resistance to the little finger, will do away with this.

If a syringe with an automatic or rubber plunger is obtained the need of constant packing for this will be dispensed with; if, however, the plunger is one that requires packing, this can be accomplished with tow and Russian tallow; or, better still, a piece of chamois leather can be bound round it with waxed thread. When on drawing back the handle of a syringe a stream of water is conducted up it on to the operator, it is a sign that the packing requires to be renewed. The Abol spraying syringe is a great improvement upon those generally found in gardens, and is very easily used.

Syringa, Mock (*see Philadelphus coronarius*).

SYRINGODEA.

Greenhouse bulbs (*ord.* Irideæ), forming a connecting link between the Crocus and the Romulea. Sandy soil, and similar treatment to the Ixia or Sparaxis (which *see*).

Principal Species :—

pulchella, aut., pale pur.

SYRPHUS.

Two-winged flies (Diptera), commonly known as Hawkflies, and generally about the size of house flies. The fleshy larvæ feed on Aphides, and should be protected rather than destroyed.

TABEBUIA.

Ornamental stove trees and shrubs (*ord.* Bignoniaceæ), resembling Tecoma. Few are cultivated, as a large size has to be attained before flowering. Propagation, by cuttings of half-ripe wood in a close case. Soil, peat, loam, and sand.

Principal Species :—

æsculifolia, 20′, Je., or., yel. spots.
Donnell-Smithii, 20′, Je., yel.
flavescens, 15′, Jy., yel.

TABERNÆMONTANA.

Ornamental stove shrubs (*ord.* Apocynaceæ), resembling some species of Gardenia, and often fragrant. Coronaria is worthy of a place in every stove. Propagation, by cuttings in spring and autumn in a close case in sandy soil. Soil, equal parts fibrous peat and loam, with sufficient sand to keep it porous. The points of the branches should be pinched several times when the plants are young to encourage a bushy habit. An annual pruning should be given after the flowers are over. Mealy bug is the worst enemy, for which syringe weekly with paraffin emulsion. (*See* Insecticides.)

Principal Species and Varieties :—

amygdalæfolia, 6′, Jy., wh.
— flore pleno, flowers double.
coronaria, 4′, sum., wh.
grandiflora, 6′, sum., yel.
— crispa, petals fringed.
speciosa, 6′, Jy., wh.

Other Species :—

acuminata, 4′, sum., wh.
acutissima, 4′, Jy., wh.
affinis, 3′, Ap., Je., wh.
australis, 6′, sum., wh.
Berteri, 4′, Jy., wh.
fagræoides, 4′ to 6′, Jy., wh.

TACCA.

Perennial stove herbs (*ord.* Taccaceæ), with thick, tuberous roots and small flowers. The roots are very rich in starch, and those of pinnatifida are used for food. They require a long rest after the leaves have died down. Propagation, by division in spring. Soil, loam, peat, and sand.

Principal Species :—

artocarpifolia, 5′ to 6′, My., br., grn., lvs. large, handsome.
cristata, 1½′ to 2′, My., pur., br. (*syn.* Ataccia cristata).
integrifolia, 2′, Je., grn., pur., yel. (*syn.* aspera).
palmata, 2′, Je., br.
pinnatifida, 3′, Je., pur. (*syn.* Brownii).
viridis, 2′, My., grn.

Syzygium (*see Eugenia*).

TACCARUM.

Stove, perennial, tuberous herbs (*ord.* Aroideæ), with large, ornamental foliage. The leaves are usually divided and subdivided into a large number of segments, which gives them a very distinct character. A long rest is required after growth. Propagation, by imported tubers. Soil, rich loam, thoroughly drained.

Principal Species :—

cylindricum, 3′ to 4′, grn., lvs. 2′ across (*syn.* peregrinum).
Warmingii, 3′, lvs. 2′ to 2½′ across.
weddelianum, 3′, spr., br., lvs. 2′ to 2½′ across.

TACHARDIA.

An important genus of scale insects, the species lacca providing lac, one of the principal ingredients of varnish, French polish, and similar preparations. In the larval state they settle upon twigs and branches for the purpose of sucking food from the plant. When feeding, the lac is formed round their bodies, and eventually the females die. The encrusted twigs are imported as "stick lac." In addition to producing lac, the females form the basis of a dye.

TACHIGALIA.

Rare stove shrubs or small trees (*ord.* Leguminosæ) of no special horticultural value. Propagation, by cuttings. Soil, fibrous loam and peat.

Principal Species :—

multijuga, 20′, sum., yel.
paniculata, 20′ to 30′, sum., yel.

TACIADENUS.

Pink, blue, or white flowered stove herbs or sub-shrubs (*ord.* Gentianeæ). Increase, by division, or by cuttings in sandy soil in a close case. Soil, equal parts fibrous loam and peat, with sand. Keep on the dry side in winter.

Principal Species :—

carinatus, 1½′, Oct., bl.
gracilis, 1′, Sep., pk.

TACSONIA.

Ornamental greenhouse climbers (*ord.* Passifloreæ). The principal difference between Tacsonia and Passiflora is found in the elongated tubular calyx of the former. Most of the species have very deeply lobed leaves. The most suitable position for Tacsonias is the roof, so that the branches will hang in a graceful manner, and show the full beauty of the pendulous flowers. Propagation, by cuttings of young shoots 4″ long in sandy soil in a close case. Soil, fibrous loam, well-rotted manure, and leaf mould, with sand. Insignis is benefited by an addition of peat in equal bulk to the loam. The best results are always obtained from Tacsonias when they are planted out in a thoroughly drained border; from 12″ to 18″ of soil is quite sufficient, and a border 2′ to 3′ wide gives ample space. Two good shoots should be encouraged to grow up each rafter. Monthly thinnings of the shoots will be necessary to allow full light and air to those required for flowering. An annual spurring back in January to within two or three eyes of the old wood is necessary. Mealy Bug and Red Spider are the two worst insect pests. After three years' growth the surface soil to a depth of 4″ should be removed, and replaced with two parts good new loam to one part well-rotted manure.

Tachia (*see Leianthus*).

Principal Species and Varieties :—

insignis, 30′, aut., intermediate house, crim.
manicata, 20′ to 30′, aut., sc. (*syn.* ignea).
mixta, 20′, aut., pk. (*syn.* eriantha and longifolia).
— quitensis, rosy pk. (*syn.* T. quitensis).
—splendens, richer colour.
mollissima, 30′, aut., ro. (*syn.* smythiana).
Van-Volxemii, 30′, aut., crim. (*syn.* grandis). The best for a cool house.

Other Species and Hybrid :—

Buchanani (now Passiflora vitifolia).
exoniensis, 30′, aut., rosy
pk., hybrid (Van-Volxemii × mollissima).
Jamesoni, 20′, Sep., ro.
sanguinea (now Passiflora vitifolia).

TÆNITIS.

Stove Ferns (*ord.* Filices), of interesting appearance, but not in general cultivation. Propagate by division, and grow in a warm house, using sandy peat with a little loam. The following figures apply to the length of the fronds.

Principal Species :—

angustifolia, 1′ to 1½′.
blechnoides, 1′ to 2′, pinnate.
lanceolata, 6″ to 12″, thick in texture.

TAGETES.

Hardy or greenhouse annuals and sub-shrubs (*ord.* Compositæ). Several species are largely used for summer bedding. Propagation, by seeds sown indoors, pricked off in boxes, and transferred to the open borders in May, or sown out of doors in April; the perennial species by cuttings. Any good garden soil is suitable. (*See also* MARIGOLD.)

Principal Species :—

erecta, 2′, sum., pale yel. African Marigold.
lucida, 1′, Aug., yel. Mexican Marigold.
patula, 1′, sum., gold, or., red, br. French Marigold.
pectinata, 1′, sum., yel.
signata, 1½′, sum., yel.
pumila, dwarfer.

Other Species :—

angustifolia, 3′, Aug., yel.
apetala, 1½′, sum., yel.
daucoides, 1½′, Je., yel.
micrantha, 3′, sum., yel.
minuta, 2′, Aug., yel.

TAINIA.

Stove Orchids (*ord.* Orchidaceæ), one or two species only being cultivated. They may be grown in perfectly drained pots of fibrous loam mixed with crocks, charcoal, and sandstone. The method of culture recommended for Calanthe is suitable.

Principal Species :—

angustifolia, 1½′, Mch., grn., br.
bicornis, 1½′, Mch., grn., red, lip yel., blotched red.
latifolia, 2′, Ap., grn., br.
penangiana, 1′, Ap., yel., br.

TALAUMA.

Stove or greenhouse evergreen trees (*ord.* Magnoliaceæ), with pretty, fragrant, Magnolia-like blossoms, which last in good condition for a very short time. Propagation, by seeds. Soil, two parts fibrous loam, two parts peat, and one part leaf mould, with sand.

Tæniopsis (*see Vittaria*).
Tail Flower (*see Anthurium*).
Talbotia (*see Vellozia*).
Talewort (*see Borago officinalis*).
Taliera (*see Corypha*).
Taligalea (*see Amasonia*).

Principal Species :—

Candollei, 6′ to 12′, sum., cream.
Hodgsoni, 40′, sum., cream, lvs. 15″ to 18″ long, 4″ to 6″ wide.
Plumierii, 12′ to 20′, sum., wh., large.
pumila (now Magnolia pumila).

TALINUM.

Stove, greenhouse, or hardy herbaceous plants (*ord.* Portulaceæ), with more or less succulent stems. Propagation, by cuttings, slightly dried, or seeds. Any light soil. The hardy species do well on rockwork.

Principal Species :—

Arnottii, 1½′, sum., yel., grn.
aurantiacum, 1½′, sum., yel.
cuneifolium, 1′, Aug., pur.
diffusum, 1′, sum., yel.

TALISIA.

Evergreen stove trees and shrubs (*ord.* Sapindaceæ). Propagation, by cuttings. Soil, equal parts fibrous peat and loam.

Principal Species :—

guianensis, 12′, Je., ro., lvs. 2′.
Princeps, 25′, Je., wh., lvs. 4′ long, in large heads.

TAMARINDUS. (TAMARIND.)

A monotypic genus of stove trees (*ord.* Leguminosæ), whose fruits are of considerable medicinal value. Propagation, by imported seeds, and by cuttings in heat in sand, covered with glass. Soil, fibrous turfy loam and sand.

Only Species :—

indica, 60′, Je., yel., red (*syns.* occidentalis and officinalis).

TAMARIX. (TAMARISK.)

Greenhouse or hardy trees or bushes (*ord.* Tamariscineæ), the hardy species forming graceful plants, and being particularly adapted for seaside planting, as well as for the shrubbery. Propagation, by cuttings in sand under a glass, a little heat being needed for the more tender species. Soil, sandy loam.

Principal Species and Varieties :—

chinensis, hdy. shr., pk. (*syn.* japonica plumosa).
gallica, 5′ to 10′, Jy., hdy. shr., wh. or pk. (*syns.* africana of gardens, algeriensis, anglica, and parviflora of gardens, not of De Candolle).
— indica, grh. shr.
— Pallasii, rosy pk.
hispida, Aug., hdy. shr., car. ro. (*syn.* kashgarica).

Other Species :—

articulata, 10′ to 20′, Jy., grh., pk. (*syn.* orientalis).
dioica, 6′, Je., grh., pk.
germanica (now Myricaria germanica).
odessana, 6′, sum., aut., hdy. shr., pale pk.
parviflora of gardens (now gallica).
tetrandra, 8′, Jy., hdy. shr., wh.

TAMONEA.

Stove biennial herbs or shrubs (*ord.* Verbenaceæ). Propagation, by seeds. Sandy soil.

Principal Species :—

spicata, 1′, Jy., bl. (*syn.* mutica).
spinosa, 1′, Jy., bl. (*syns.* curassavica and verbenacea).

Talipot Palm (*Corypha umbraculifera*).
Tallow Shrub (*Myrica cerifera*).
Tallow Tree of Sierra Leone (*Pentadesma butyracea*).
Tamarind Tree (*see Tamarindus indica*).
Tamarisk (*see Tamarix*).

TAMUS (*syn.* TAMNUS).

Three species of hardy or greenhouse twining plants (*ord.* Dioscoreaceæ). Propagation, by seeds or division. Common soil.

Principal Species :—

communis, My., hdy., greenish, berries sc. Black Bryony, Murrain Berries, Lady's Seal.
Elephantipes (*see* Testudinaria Elephantipes).

TAN.

The use of tan, the spent bark of the tan pit, is much less frequent in gardens than formerly. It was at one time largely used for forming hotbeds. It is also used as plunging material. As a manure it decays slowly, and should be made up in a heap with soil, lime, and animal manure. Its value by itself as a manure is small.

TANACETUM. (TANSY.)

Annual or perennial herbs (*ord.* Compositæ), generally hardy, but not of great value for the garden. The crisped-leaved variety of vulgare is used for garnishing, and Herderi and leucophyllum are good rockery plants.

Principal Species and Varieties :—

Balsamita (now Chrysanthemum Balsamita).
camphoratum, 1′, sum., hlf-hdy. or hdy., yel., Camphor scented (*syns.* elegans and huronense of gardens).
fruticulosum bracteatum, 1′, sum., yel., plant greyish.
Herderi, 6′, sum., hdy. per., yel., lvs. silvery.
leucophyllum, 9″, sum., hdy. per., yel., lvs. silky.
vulgare, 2′ to 3′, Aug., yel. Common Tansy.
— crispum, lvs. curled.

TANAKEA.

A recently introduced Japanese plant (*ord.* Saxifrageæ), with small flowers resembling Tiarella. Propagation, by seeds or division. Moist, peaty soil.

Only Species :—

radicans, sum., hdy. per., wh.

TANKS.

Much valuable rain water which is now allowed to run to waste might be saved and turned to account if a proper system of reservoirs were forthcoming. In fact, tanks of various sizes form a highly important part of the equipment of a garden. Every glasshouse should be fitted with a rain water tank, and if a hot water pipe can be conducted through it so much the better. The tank may be sunk below the floor level, and covered with gratings if desired, but a dipping hole, covered with an easily lifted trapdoor, must be furnished. Even when water is laid on in pipes a tank should be placed under each tap, no matter whether it be indoors or out; much time in filling cans will then be saved, and there will be no unsightly rinsing of the soil beneath the tap.

Paraffin tubs, burnt out and sawn in halves, make capital tanks, and these may be sunk to the ground level, if desired. Galvanised iron tanks, strongly riveted, are much thought of, and probably are the cheapest and best. Brick tanks lined with cement are employed where larger reservoirs are needed. Slate slabs are occasionally used.

All heating systems are furnished with supply tanks, and these must be kept about three parts full.

Tanghinia (*Cerbera Tanghin*).
Tangier Pea (*Lathyrus tingitanus*).
Tanners' Tree (*Coriaria myrtifolia*).
Tansy (*see Tanacetum vulgare*).

TAR.

A product obtained from bituminous coal during gas making. Gas, mineral, or coal tar, as it is variously called, is put to a number of uses in the garden. Painted over the wooden supports of pits or frames, outhouses, palings, and, in fact, woodwork generally, it answers almost as well as paint for a preserver, and is considerably cheaper. The tarpaulin so much used for covering purposes is made of stout canvas coated with tar until it is waterproof. As a trap for insects tar may be turned to considerable advantage. Boards smeared with it are excellent traps for the Turnip Beetle, various insects attacking the Raspberry, froghoppers, and grasshoppers. Mixed with an equal quantity of cart grease or about a third of fish oil to keep it viscid, it is frequently used for smearing upon the bands placed round fruit trees in the autumn to prevent the egg laying females of the Winter Moth from ascending the trees.

As a styptic for dressing the ends of cut branches Stockholm tar has a great vogue. It is true that it has rather biting properties, and kills, while it hardens, the outermost layers of wood, but in woody plants no harm results from this, and, as the wood is made impervious to moisture, much good. Tar may also be used for dressing wounds. For herbaceous plants and Vines another styptic should be selected.

Tar water when diluted with clear water is a good insecticide.

Benzol or benzine (spirit of tar) is a volatile, transparent, and highly inflammable fluid obtained by distillation from coal tar. It has been employed occasionally as an insecticide.

TARAXACUM. (Dandelion.)

Hardy herbs (*ord.* Compositæ). Propagation, by seeds or division. Common soil. As a salad plant officinale is covered to blanch the leaves.

Principal Species :—

montanum, 4″, Aug., yel. (*syn.* Lasiopus sonchoides).
officinale, 6″, Mch., yel.: many *syns.* Dandelion.

TARCHONANTHUS. (African Flea Bane.)

Three species of greenhouse shrubs (*ord.* Compositæ), with flower heads resembling those of the Artemisias. Propagation, by cuttings in sand. Soil, sandy loam.

Principal Species :—

camphoratus, 6′, Jy., pur.

TARENNA.

Stove trees and shrubs (*ord.* Rubiaceæ), at one time referred to Webera. None of the species is in cultivation.

TARO.

This is the name given by the Pacific Islanders to the tubers of Colocasia Antiquorum, which they use largely for food. The tubers are acrid and poisonous, but their poisonous properties are destroyed by thorough cooking in various fashions. They are made into puddings, baked or boiled, and the young leaves eaten like Spinach.

Tape Grass (*see Vallisneria spiralis*).
Tapeinophallus (*see Amorphophallus*).
Tapeinotes (*see Sinningia*).
Tapogomea (*see Cephaëlis*).

TARRAGON.

This is Artemisia dracunculoides (A. Dracunculus of some authorities), a rather tender perennial, whose leaves are used in salads and seasoning, and in producing Tarragon vinegar. A dry, warm position, and a little winter protection, are advisable. Like other herbs, it may be cut and dried in autumn for winter use. Propagation, by cuttings in a little heat, or by division in spring. Common soil.

TAUSCHERIA.

The only species (lasiocarpa) of this genus (*ord.* Cruciferæ) is a yellow-flowered hardy annual of no garden value, growing in common soil.

TAVERNIERA.

Greenhouse sub-shrubs (*ord.* Leguminosæ), only a few of which are cultivated. Propagation, by seeds or cuttings under glass, in bottom heat. Soil, mellow loam and sand.

Principal Species :—

lappacea, Jy., Aug., trailing, yel.
Nummularia, 1′ to 2′, Jy., red (*syns.* cuneifolia, ephedroidea, gonoclada, incana, and spartea). East Indian Moneywort.

TAXODIUM. (Deciduous Cypress.)

Handsome deciduous trees (*ord.* Coniferæ). The swollen buttresses of the base of distichum are conspicuous, together with the "knees" which rise from the roots around the tree itself where flooded by water. The trunk is often very thick in proportion to the height. The timber is used for lumber, posts, and fencing. Heterophyllum is a low Chinese tree or shrub. Propagation, by seeds, which give plants varying much in character; by layers; and by cuttings with leaves, struck in water. Moist soil, distichum only attaining its full beauty in such a medium.

Only Species and Select Varieties :—

distichum, 100′ in Britain. My., female cones solitary or in small bunches, cones a little smaller than a Walnut (*syns.* microphyllum and Cupressus disticha). Deciduous Cypress, Bald Cypress, Swamp Cypress.
— denudatum, branches slender, lvs. scattered.
— fastigiatum, branches erect.
— nanum, dwarfer.
— pendulum, smaller, more slender, branches generally pendulous (*syns.* sinense, Glyptostrobus pendulus, and Cupressus disticha imbricaria).
giganteum (*see* Sequoia).
heterophyllum, 10′, cones egg shaped (now Glyptostrobus heterophyllus). Chinese Water Pine.
mucronatum, 120′, tender, lvs. more slender than those of distichum, and sub-persistent (*syn.* mexicanum).

TAXUS. (YEW.)

Description.—Hardy evergreen trees or shrubs (*ord.* Coniferæ). The native Yew, baccata, is a familiar tree in its various forms, and it is often seen associated with churchyards. As an ornamental tree the Yew is very valuable, and the sombre foliage of the typical species may be much relieved by the judicious use of the varieties. The Irish Yew—baccata fastigiata—is largely used for ornamental purposes, for which its pyramidal habit well adapts it. The Yew makes capital evergreen hedges, though care must be taken that cattle and horses have not access to it, on account

Tasmannia (*see Drimys*).
Tasteless Mountain Currant (*Ribes alpinum*).
Taxanthema (*see Statice*).

of its poisonous character. It has been a favourite tree for topiary work (which *see*), its adaptability to training and clipping making it one of the best plants for the purpose. Small plants of the ornamental forms are pretty in window boxes or for winter bedding. Propagation, by seeds, sown in spring, after having been mixed with sand and buried in a heap for some time; by cuttings in August, in sandy soil, in frames or under handlights until rooted; also by grafting and layering. Any common soil.

Principal Species, and Selection of Varieties :—

[NOTE.—The nomenclature is that of the *Manual of Coniferæ*.]

baccata, 50′, Mch., branches spreading. Common Yew.
— adpressa, 8′, thick, spreading bush (*syns.* adpressa, Gordoni, and tardiva).
— albo-variegata, edged silver.
— argentea, striped silver.
— aurea, golden yel. (*syn.* baccata elvastonensis).
— Dovastoni, branches horizontal or drooping, branchlets drooping; a fine form.
— Dovastoni aureo-pendula, lvs. pale grn., edged yel.
— Dovastoni variegata, young lvs. edged yel., when older silver wh.
— elegantissima, edged creamy wh.
— erecta, stiffer, more erect, lvs. smaller. Fulham Yew, Upright Common Yew.
— fastigiata, lvs. in tufts, or scattered (*syns.* fastigiata and hibernica of gardens). Irish Yew, Florence Court Yew.
— fastigiata aureo-variegata, lvs. variegated yel.
— fastigiata variegata, lvs. edged and striped wh.
— fructu-luteo, fruit yel.
Washingtoni, variegated (*syn.* canadensis Washingtonii).

Other Species and Varieties : —

baccata adpressa stricta, branches erect.
— adpressa variegata, tips creamy wh.
— brevifolia, low tree (*syn.* T. brevifolia of gardens, not Nuttall).
— cheshuntensis, between Common and Irish Yew.
— ericoides, dwarf, close branches (*syns.* ericoides and epacridioides of gardens).
— glauca, like cheshuntensis, but larger (*syn.* baccata nigra). Blue John.
— gracilis pendula, sub-pendulous, larger than the next.
— pendula, sub-pendulous, slow grower (*syn.* baccata Jacksonii).
— procumbens, prostrate. Many other vars., such as columnaris, compressa, erecta, horizontalis, microcarpa, nana, pyramidalis, recurvata, etc.
brevifolia, 30′ to 80′, branches slender, drooping, lvs. yellowish grn. (*syns.* Boursieri and lindleyana). Californian or Western Yew.
canadensis, 2′ to 3′, prostrate, lvs. shorter and narrower than those of baccata (*syn.* baccata var. canadensis). Canadian Yew.
cuspidata, 20′, lvs. yellowish grn. beneath, branches spreading (*syn.* baccata var. cuspidata).
floridana, 25′, spreading habit.
harringtoniana (now Cephalotaxus pedunculata).

TCHIHATCHEWIA.

A rare and beautiful hardy Alpine (*ord.* Cruciferæ), with Vanilla-scented flowers in rounded heads. Propagation, by seeds sown in spring. Soil, loam and leaf mould.

Only Species :—

isatidea, 6″ to 12″, My., rosy red.

TECOMA. (TRUMPET FLOWER, TRUMPET CREEPER.)

Ornamental greenhouse, stove or hardy, erect, twining, or climbing shrubs (*ord.* Bignoniaceæ), with handsome tubular flowers, generally in bunches. Propagation, by seeds, root cuttings, layering, or cuttings of the young shoots under

Photo: W. Rossiter, Bath.

TAXUS BACCATA IN A WILTSHIRE GARDEN.

glass. Soil, good, mellow loam. Exposure to light, so as to ripen the growths, with plenty of water in summer, are needed for the Tecomas. Radicans should have a sheltered position against a wall when grown outside.

Principal Species and Varieties :—

amboinensis, sum., st. cl., or. red.
australis, Je., grh. cl., yellowish wh. and pur., red (*syns.* diversifolia and Bignonia Pandorea).
— Manglesii, a good var. (*syn.* Manglesii of gardens).
capensis, Aug., grh. cl., or. sc.
grandiflora, Jy., hdy. at Kew, cl., sc. (*syn.* Bignonia grandiflora). Several vars.
jasminoides, Aug., grh. cl., wh., red.
radicans, sum., hdy. cl. shr., rooting as it climbs, sc. (*syn.* Bignonia radicans). Several vars., varying from yel. to deep red. Minor has narrower sc. flowers, præcox is early, and Thunbergii late.
Smithii, 2′ and upwards, aut., grh., or. spotted throat. Considered by some authorities to be a hybrid, and by others as synonymous with fulva.

Other Species :—

austro-caledonica, sum., st. cl., wh.
chrysantha, 10′, st., yel. (*syns.* Bignonia chrysantha and Tabebuia chrysantha).
filicifolia, st. cl., lvs. finely divided (*syn.* Campsidium filicifolia).
fulva, 15′, Jy., st. shr., yel.
Manglesii (*see* australis var.).
mirabilis (*see* valdiviana).
mollis, 6″, Jy., st., yellowish red (*syn.* sorbifolia).
ricasoliana, grh., rosy pk., darker veins.
rosæfolia, 6′, Jy., st., yel.
sambucifolia, 6′, Jy., st., yel. (probably a form of stans).
serratifolia, 20′, st. tree, yel. (*syn.* Tabebuia serratifolia).
sorbifolia (*see* mollis).
spectabilis, 10′, sum., st., pur. (*syns.* Bignonia and Tabebuia spectabilis).
stans, 12′, sum., st., yel.: var. apiifolia, lvs. cut (*syn.* Bignonia incisa of gardens).
undulata, 10′, sum., st., or. (*syn.* Bignonia undulata).
valdiviana, st. cl. shr., or. (*syns.* mirabilis of gardens and Campsidium chilense).

TECOPHILÆA.

Exquisite little Crocus-like, bulbous flowers (*ord.* Hæmodoraceæ), which are hardy on light soils, but are more grown in frames or in pots in greenhouses. Propagation, by seeds, or offsets when the bulbs are at rest. Soil, sandy loam. Plant 3″ or 4″ deep, and protect from slugs.

Only Species and Varieties :—

Cyanocrocus, 6″, spr., bl., wh. throat (*syn.* cyaneo-crocea).
— Leichtlini, deep bl.
— Regelii, segments narrower.
violæflora, 6″, spr., bl.

TECTONA. (Teak.)

Large stove evergreen trees (*ord.* Verbenaceæ). Grandis, 80′ to 100′, white, yields the timber called Teak, largely used in shipbuilding, and by gardeners in the woodwork of glass structures, for which its endurance of wet and changes of weather adapt it so well.

Tea (*see Camellia theifera*).
Tea Berry or Canada Tea (*see Gaultheria procumbens*).
Tea, Botany Bay (*Smilax glycyphylla*).
Tea, Paraguay (*see Ilex paraguayensis*).
Tea Tree (*Lycium barbarum*).
Teak Tree, African (*Oldfieldia africana*).
Teak Tree, Indian (*Tectona grandis*).
Teasel, Teazel, Teagle (*see Dipsacus*).

TEEDIA.

Greenhouse shrubs (*ord.* Scrophularineæ), with small flowers. Propagation, by seeds, or by cuttings under a glass in sand. Light, rich soil.

Only Species :—

lucida, 2′, Ap., pk.
pubescens, 2′, My., pk.

TEESDALIA.

Two species of hardy, white-flowered annuals (*ord.* Cruciferæ), not worth growing in the garden. Nudicaulis is the native Pepper Cress. The other is regularis (*syn.* Lepidium). *Syns.* of nudicaulis are caulescens, Iberis, and irregularis. Petræa is Hutchinsia petræa.

TELANTHERA.

Half-hardy herbs (*ord.* Amarantaceæ), used generally for carpet bedding, and grown in gardens under the name of Alternanthera, which *see* for species, varieties, and cultivation.

TELEKIA (*see* Buphthalmum).

TELEPHIUM. (Orpine.)

Hardy perennial herbs (*ord.* Ficoideæ). They have small white flowers and are not sufficiently showy to warrant a place in gardens. Imperati, the Tree Orpine, is occasionally met with.

TELFAIRIA.

A genus of stove plants (*ord.* Cucurbitaceæ). Pedata is grown in West Africa for its edible seeds, from which a useful oil is extracted by pressure. Propagation, by cuttings, under a bell-glass. Light, rich soil.

Only Species :—

occidentalis, Sep., cl., male flowers pur., female flowers wh., eye pur., fruit 2′ long, greenish yel.
pedata, Jy., cl., male and female flowers pur., fruit 3′ long, grn. (*syns.* Fevillea pedata and Joliffia africana).

TELIPOGON (*syn.* Thelypogon).

Stove Orchids (*ord.* Orchidaceæ). They should be grown in baskets of peaty fibre, sphagnum moss, and pieces of broken pots, or on a block of wood with fresh sphagnum.

Principal Species :—

Crœsus, yel., with dark network.

TELLIMA.

Hardy annual or perennial herbs (*ord.* Saxifrageæ). Propagation, by division or by seeds. Common peaty soil.

Principal Species :—

affinis, 1′, sum., per., wh.
— purpurea, lvs. bronzy in aut.
grandiflora, 2′, Ap., per., grn.
parviflora, 1′, My., per., pk. (*syn.* Lithophragma parviflora).

TELOPEA.

Handsome, greenhouse, evergreen shrubs (*ord.* Proteaceæ), with showy flowers. Propagation, by layering suckers in small pots, or by cuttings of the ripe growths in sand under a glass, keeping cool until growth apparently begins, when heat may be applied. Sandy peat. Planting out is preferable to growing in pots.

Principal Species :—

speciosissima, 6′ to 8′, Je., crim. (*syn.* Embothrium speciosissimum). Waratah.

Telegraph Plant (*Desmodium gyrans*).

TEMPLETONIA.

Greenhouse shrubs or sub-shrubs (*ord.* Leguminosæ). Propagation, by cuttings of the young growths in sand, under a bell-glass. Soil, sandy loam and peat.

Principal Species :—

retusa, 3′, Mch., red or wh. (*syn.* glauca). Coral Bush.

TENARIS.

Greenhouse perennial herbs (*ord.* Asclepiadeæ). Propagation, by cuttings in April in sand, under a bell-glass, in heat. Soil, sandy loam and fibrous peat, with a few pieces of charcoal and a little leaf soil.

Principal Species :—

rostrata, 1½′, sum., wh., yel., pk.

TENTHREDINIDÆ. (Sawflies.)

This section of Hymenoptera plays a somewhat important part in gardens, and that a mischievous one. A number of genera and many species are included in the collective term Sawflies, and among them they plague many cultivated plants, from the highest forest tree to the lowliest herb. Eriocampa, Lophyrus, Lyda, and Nematus are typical genera, and information has been given under these and other headings and also under the titles of the plants attacked. The name Sawfly bears allusion to the modified ovipositor, which resembles a minute saw with two blades. The saws are strengthened with cross bars like the bars of a file. The body is rather broad, and, unlike most Hymenoptera, the passage between the thorax and abdomen is not narrowed. The wings are usually transparent, and the mouths suited for biting and cutting. From about the middle of May to the end of July is the season for the perfect flies to appear, and occasionally there are two broods. The larval stage is that which does the direct damage in most cases, and the larvæ vary a great deal in their habits.

Tenagocharis (*see Butomopsis*).
Tenoria (*of Sprengel, see Bupleurum*).

TEPHROSIA.

Stove, greenhouse, or half-hardy herbs, sub-shrubs, or shrubs (*ord.* Leguminosæ), few of which are of sufficient decorative value to be worth cultivating in gardens. Propagation, by seeds in heat, or by cuttings under a bell-glass.

Principal Species :—

capensis, Jy., grh. sub-shr., pur.
grandiflora, 2′, Je., grh., red (*syn.* Galega grandiflora).
virginiana, 2′, Je., hlf-hdy. per., cream, pur.

Other species are candida, pallens, purpurea, and pinnata. Suberosa is now Mundulea suberosa.

Terminalia angustifolia.

TERMINALIA.

Stove evergreen trees (*ord.* Combretaceæ) rarely grown in gardens. Propagation, by cuttings of ripe wood in sand under a bell-glass. Soil, light fibrous loam and peat, with coarse sand.

Principal Species :—

angustifolia, 30′, Je., wh. (*see* figure).
buceras, 30′, sum., yel., wh.
Arjuna, 70′, sum., grn.
Catappa, 20′, Je., wh.
bellerica, 20′, My., grn., yel.
elegans (now Polyscias paniculata).

TERNSTRŒMIA.

Evergreen stove shrubs (*ord.* Ternstrœmiaceæ). Propagation, by cuttings of ripened growths, in sandy peat, under a bell-glass. Soil, fibrous loam and peat, with coarse sand.

Principal Species :—

brevipes (*see* elliptica).
elliptica, 6′, Jy., wh. (*syn.* peduncularis).
punctata, 6′, Jy., grn.
venosa, 6′, Jy., wh.

Terpnanthus (*see Spiranthera*).

TERRACES.

Where a mansion is considerably elevated above the general surroundings, and the ground slopes somewhat sharply from it on one or more sides, it is usual to construct a broad promenade on a level with the floor of the dining and drawing rooms. Such an area is a terrace, and the material composing it is retained by means of walls of masonry or turfed banks. There may be a series of such terraces at varying levels, connected by flights of steps, leading down to the lower grounds, the park, lake, or stream. Where the slope is gradual the terraces may be made very broad; one terrace is not infrequently laid out in beds as a flower garden. In hilly districts in southern Europe it is a common practice to terrace the hillsides, and cultivate Vines and other subjects on the terraces. In Guernsey some of the steep parts are terraced and glasshouses built on each level. In the United Kingdom terraces are usually constructed for pleasure and effect rather than for the purpose of adding to the cultivated area.

Photo: W. Rossiter, Bath.

A Terrace Garden.

TESTACELLA.

Slugs possessing small shells. They are about 3″ long when fully extended, usually dull yellow in colour, sometimes almost black. The rear end of the animal is provided with a small shell that acts as a guard when the owner is burrowing. The peculiarity of this slug is that it is carnivorous, and should therefore be protected. It feeds on earthworms and small slugs. Haliotidea is the most common. Maugei is sometimes found in the west of England, but it has probably become naturalised since introduction from southern Europe; it differs from haliotidea in having a larger shell and brown colouring. Scutulum, now separated from haliotidea, is probably the most common.

TESTUDINARIA. (Elephant's Foot.)

Warm greenhouse deciduous climbers (*ord.* Dioscoreaceæ). The crown or covering of the rootstock grows to a large size, and is woody. Propagation, by cuttings in spring, in sandy soil, under a bell-glass. Soil, sandy loam and fibrous peat in equal proportions.

Principal Species :—

Elephantipes, 8′, Jy., yel. (*syn.* Tamus Elephantipes of *Botanical Magazine* 1347). Elephant's Foot, Hottentot Bread.

TETRACERA.

Stove evergreen climbers (*ord.* Dilleniaceæ) of no horticultural value. Propagation, by cuttings in sand under a bell-glass. Soil, loam and peat.

Principal Species :—

alnifolia, 20′, Je., yel. volubilis, 12′, Ap., yel.
potatoria (*see* alnifolia).

TETRAGONIA.

A genus (*ord.* Ficoideæ) allied to Mesembryanthemum, whose value lies in expansa, a yellow, August-flowering annual, grown in gardens under the name of New Zealand Spinach, which *see*.

Tetragonolobus (*see Lotus*).

TETRAGONOTHECA.

Hardy perennial herbs (*ord.* Compositæ). Propagation, by division or by seeds. Light and well-manured soil.

Principal Species :—

helianthoides, 2′ to 3′, Aug., yel.

TETRAMICRA.

Intermediate house epiphytal Orchids (*ord.* Orchidaceæ). Propagation, by division when growth is starting. They thrive in small Teak baskets, or on blocks of Tree Fern stem, with a little sphagnum about the roots.

Principal Species : –

bicolor, 2″, win., wh., lip marked pur. (*syns.* serrulata and Leptotes bicolor).
rigida, 1¼″, spr., grn., lip rosy pur. (*syn.* Brassavola elegans).
serrulata, 3″, spr., wh., lip crim. pur. (*syn.* Leptotes serrulata).

TETRANEMA.

A pretty herbaceous stove perennial (*ord.* Scrophularineæ). Propagation, by seeds or cuttings in spring, in very sandy soil. Soil, sandy loam and fibrous peat.

Only Species :—

mexicana, 6″, Je., whitish pur. Mexican Foxglove.

TETRANTHUS.

Stove evergreen trailers (*ord.* Compositæ). Propagation, by cuttings or division in spring. Soil, three parts sandy, fibrous loam and one part fibrous peat.

Principal Species :—

littoralis, 4″, Aug., wh.

TETRAPOGON.

Hardy perennial Grasses (*ord.* Gramineæ). Propagation, by seeds and division. Any ordinary garden soil.

Principal Species :—

villosus, 1′, aut., yel.

TETRAPTERIS.

Stove evergreen climbers (*ord.* Malpighiaceæ). Propagation, by cuttings of ripened growths in summer, retaining the leaves, and inserting in sand under a bell-glass. Soil, fibrous loam and sandy peat.

Principal Species :—

acutifolia, 6′, My., yel.
discolor, 6′, My., yel.
inæqualis, 6′, My., yel. (*syn.* citrifolia).

TETRATHECA.

Elegant, hard-wooded, greenhouse evergreens (*ord.* Tremandreæ). Propagation, by cuttings of the side growths in sand, under a bell-glass. Great care should be taken to prevent damping. Soil, three parts fibrous peat and one part sandy loam, with charcoal and sharp grit to ensure porosity.

Principal Species :—

ericæfolia, 1′, Jy., ro. (*see* figure).
glandulosa, 1½′, Jy., pur.
hirsuta, 2′, Mch., pk.
juncea, 2′, Jy., pur.
pilosa, 1½′, Jy., pur.
verticillata (now Platytheca galioides).

TETRAZYGIA.

Stove evergreens (*ord.* Melastomaceæ). Propagation, by cuttings of side growths getting firm, in sand. Soil, sandy loam and fibrous peat.

Principal Species :—

angustiflora, 5′, My., wh.
discolor, 5′, My., wh.
elæagnoides, 4′, spr., pk. or wh.

TETTIGONIA.

This generic title is sometimes used instead of Cercopsis, Cicada, or Aphrophora for a species named spumaria, an insect better known in gardens as the Cuckoo Spit (which *see*) or Frog Hopper.

TEUCRIUM.

Hardy and greenhouse evergreens and herbaceous perennials (*ord.* Labiatæ). Propagation, by division in spring for the herbaceous species, and by cuttings for the evergreens. Ordinary, fertile soil.

TETRATHECA ERICÆFOLIA.

Principal Species and Varieties :—

bicolor, 1′, Jy., grh., pur. bl. (*syn.* orchideum).
canadense, 2′, Aug., hdy., pur.
Chamædrys, 9″, Jy., hdy., pur.
— foliis aureis, hdy., lvs. yel.
flavum, 2′, Aug., hdy. or grh., yel.
fruticans, 2′ to 4′, Jy., Aug., hdy. or hlf-hdy. shr., bl.
hircanium, 1½′, Sep., hdy., pur.
Marum, 1′, sum., hdy., reddish pur.
Scorodonia, 1′, Je., hdy., yel.
— variegatum, variegated.

TEYSMANNIA.

Stove Palms (*ord.* Palmæ). Propagation, by imported seeds. Soil, sound loam. The only species is altifrons, 10′, with large, entire leaves.

THALIA.

Greenhouse or stove evergreens (*ord* Scitamineæ). Propagation, by division. Soil, rich, light loam. Dealbata is quite hardy at Kew.

Tetramerium (*see Paramea*).
Tetranthera (*see Litsea*).
Tetrapeltis (*see Otochilus*).

Texas Umbrella Tree (*Melia Azedarach umbraculiformis*).
Thalamia (*see Phyllocladus*).

Principal Species :—

dealbata, 6′, Jy., bl.; best in a tub of water.
geniculata, 2′, Aug., st., bl. ; will flower in grh. in sum.

THALICTRUM. (Meadow Rue.)

Hardy herbaceous perennials (*ord.* Ranunculaceæ) of considerable beauty, both in flowers and foliage, and quite indispensable in the mixed border. Propagation, by division in spring. Soil, moist sandy loam, mixed with leaf mould.

Principal Species and Varieties :—

adiantifolium (*sec* minus).
anemonoides, 3′, Ap., yel. (*syn.* Anemone thalictroides).
angustifolium, 3′, Je., yel. ; nigricans is a fine var.
aquilegifolium, 3′, Je., pur. ; atropurpureum is a fine var.
Chelidonii, 2½′, Je., pur.
minus, 1′, Je., pale yel. ; many very fine vars.

Other Species :—

alpinum, 6″, Je., yel.
calabricum, 3′, Jy., yel.
Cornuti, 3′, My., yel.
cultratum, 3′, Je., greenish yel.
Delavayii, 3′, sum., pur.
flavum, 4′, Je., or. ; sphærocarpum is a good var.
glaucum, 6′, Je., yel.
squarrosum, 1′, Je., yel. (*syn.* trigynum).

THAMNEA.

Greenhouse evergreen shrubs (*ord.* Bruniaceæ). Propagation, by cuttings in spring, in very sandy soil, under a bell-glass. Soil, fibrous, sandy loam, with a little crushed charcoal.

Only Species :—

uniflora, 1′, Ap., wh.

THAMNOCHORTUS. (Shrubby Grass.)

Greenhouse perennial herbs (*ord.* Restiaceæ) from South Africa. The flowering stems are Rush-like. Dichotomus is the principal species, but it has nothing to recommend it to gardeners.

THAPSIA. (Deadly Carrot.)

Greenhouse perennials (*ord.* Umbelliferæ), producing a Carrot-like root, and attractive on account of the large, ornamental leaves. Propagation, by seeds. Soil, mellow loam.

Principal Species :—

decipiens, 6′, Jy., wh.
edulis, 4′, My., wh. (*syn.* Monizia edulis).
garganica, 3′, Jy., yel.
villosa, 4′, Je., yel.

THELEPHORA.

A genus of Fungi whose members occasionally do some damage to living trees. They are closely allied to the true Mushrooms, but differ from them in having the hymenium smooth or ridged and warted. The texture also is leathery. Several species are to be found burrowing into the trunks of trees. Laciniata may be distinguished by having its reproductive parts disposed as rusty brown, semicircular, horizontal plates, several of these plates lying close together, the one overlapping the other. Young trees are usually attacked, rarely old ones, and the fungus is generally to be seen on the collar of the plants, close to the ground ; occasionally it takes up its abode in the soil. Perdrix attacks Oaks very frequently in Germany, the affected wood turning reddish brown, and showing mottles like those of a partridge, whence the specific name. Hirsuta, more correctly Stereum hirsutum, is common in Britain upon dead stumps ; it also attacks Oaks, according to Professor Hartig. The removal and destruction by fire of attacked trees seems to be the only possible remedy. Nothing can be done to save the infected specimens, as the mycelium of the fungus is internally disposed. Diseased branches should be promptly excised.

Thamnocalamus (*see Arundinaria*).
Thamnopteris (*see Asplenium*).
Thatch Palm (*see Euterpe, Sabal, and Thrinax*).
Thea (*see Camellia*).

THELESPERMA (*syn.* Cosmidium).

Stove, greenhouse, or hardy herbs or sub-shrubs (*ord.* Compositæ). The hybrid named below requires the same culture as the popular Coreopsises.

Principal Species and Hybrid :—

burridgeanum (filifolium × Coreopsis tinctoria), Je., Sep., hdy. ann., or., yel., blk.
filifolium, 1′ to 2′, sum., hdy. ann. or bien., ray florets yel., disc pur.

THELYMITRA.

Greenhouse terrestrial Orchids (*ord.* Orchidaceæ), of no special garden value, and rarely grown. They may be treated in the same way as the Bletias.

Principal Species :—

carnea, 6″ to 10″, My., pk., stems slender.
grandiflora, 2′, greyish bl., twenty-five to thirty in a large spike ; a showy plant.
ixioides, 1′ to 1¼′, My., bl.
longifolia, 1′, My., bluish pk. or lil., lvs. long, narrow (*syns.* Forsteri, graminea, and pauciflora).

THEMISTOCLESIA.

A small, obscure genus (*ord.* Vacciniaceæ) of evergreen shrubs. Propagation, by cuttings, in sandy soil, in a close frame. Soil, fibrous loam and peat in equal parts, with sand.

Principal Species :—

coronilla, Jan., grh. dwarf shr., dark red.

THENARDIA.

Climbing stove shrubs (*ord.* Apocynaceæ), increased by cuttings of the young shoots, taken off with a heel of the old wood, in brisk bottom heat. Soil, loam two parts, peat one part, both fibrous, with sand.

Principal Species :—

floribunda, 10′, Je., st., pk., in bunches, showy.

THEOBROMA (*syn.* Cacao).

The value of this genus (*ord.* Sterculiaceæ) is wholly economic, seeing that Cacao is the source of chocolate. Propagation, by cuttings of ripened shoots, in sand, in a close case, with bottom heat. Soil, equal parts peat and fibrous loam, with sand. The plants do best if planted out in a prepared border. Plenty of water. An annual pruning is necessary to keep them within bounds.

Principal Species :—

Cacao, 20′, My., st., calyx ro., corolla yel., fruits yel. or red, 8″ long. Cacao or Cocoa Plant, Chocolate Nut Tree.

THEODOLITE.

A complicated and expensive instrument used by land surveyors, and sometimes by landscape gardeners, for calculating vertical and horizontal angles, as well as heights and distances. Its use

is occasionally necessary when, in laying out large estates, the heights of objects widely separated have to be ascertained. In common levelling operations the straightedge, borning rods, and ordinary spirit level are enough. (*See* LANDSCAPE GARDENING.)

THEOPHRASTA.

Stove shrubs (*ord.* Myrsineæ), of erect habit and stately presence. Propagation, by cuttings of semi-matured shoots, in a close case, with brisk bottom heat. Soil, peat and loam in equal parts, with sand.

Principal Species :—

imperialis, Ap., yellowish grn., fruits like small Apples. lvs. 3′ long, 10″ broad, imposing.

THERMOMETER.

An instrument by which the degree of heat is measured by the expansion of a ball of mercury or a quantity of spirit enclosed in an hermetically sealed glass tube. At the side of the tube is a graduated scale by which the amount of expansion is calculated. Prior to the sealing of the tube as much air as possible is expelled, and the mercury or spirit thus works in something that is very nearly a vacuum, so that there is no resistance to the expansion. There are three "scales" by which the expansion is calculated, in general use, viz. Fahrenheit, which has the freezing point of water at 32° and the boiling point at 212°; Réaumur, which has the freezing point of water at 0° (zero) and its boiling point at 80°; and Centigrade, which places the freezing point of water at 0° (zero) and its boiling point at 100°. The Fahrenheit scale is the one generally adopted in this country.

A minimum and maximum registering instrument is needed for meteorological observations outdoors. The maximum and minimum are obtained by means of a sensitive needle which is pushed up or down by the mercury, and left to mark the extreme limit of the rise or fall of the temperature. This needle is "set" to the mercury by means of a magnet. Outdoor thermometers should be fixed to a stout post about 4′ from the ground, should face towards the north, and be covered in by a box or screen, so as to give the "shade" reading. The height of the glass with the sun full upon it is not a true index to the general temperature.

There should be a thermometer placed in each glasshouse, and it is an excellent plan to affix to it a little celluloid tablet, upon which to mark the degree of heat to be maintained in the house as a guide to the stoker. (*See also* TEMPERATURES.)

Special plunging thermometers are made for ascertaining the temperature of Mushroom and hotbeds. A stick is more commonly used in practice, and although a rough-and-ready test it is usually sufficient for the practical man. (For wet and dry thermometers, *see* HYGROMETER.)

THERMOPSIS (*syn.* THERMIA).

Hardy perennial herbs (*ord.* Leguminosæ). Montana is a gem for nooks in the rockery, and looks at its best when rising among dwarf plants. Propagation, by seeds. The roots do not take kindly to division. Soil, light, rich loam, in a sheltered situation.

Theresia (*see Fritillaria*).

Principal Species :—

barbata, 1′, Je., hdy., deep pur., stems woody.
corgonensis, 2′, sum., hdy., yel.
lanceolata, 1′, sum., hdy., yel. (*syn.* Podalyria lupinoides).
montana, 2′, sum., hdy., yel. (*syn.* fabacea of Hooker).
nepalensis (*see* Piptanthus nepalensis).

THEROPOGON.

A greenhouse perennial herb (*ord.* Liliaceæ), with Grass-like leaves. Propagation, by seeds, sown in heat, in spring, and by root division. Soil, light sandy loam.

Only Species :—

pallidus, spr., grh., wh., sometimes flushed pk.

THESIUM.

Stove, greenhouse, and hardy herbs (*ord.* Santalaceæ), of no decorative value. A few of them have been introduced, but are not now in cultivation.

THESPESIA.

Stove trees and tall-growing herbs (*ord.* Malvaceæ), not well known to gardeners, although the flowers of some of the species are showy. Propagation, by ripe cuttings, in sand, in bottom heat. Soil, loam and peat in equal parts, with sand.

Principal Species and Variety :—

grandiflora, 30′, st., My., red; close to populnea in habit.
populnea, 40′, st., Je., yel., with central pur. spot, finally all pur. Mahoe, Portia-nut Oil Plant, Umbrella Tree.
— guadalupensis, petals narrower.

THEVETIA.

Stove shrubs or small trees (*ord.* Apocynaceæ), little known to gardeners. Propagation, by cuttings, in sand, in a close frame, with bottom heat. Soil, fibrous loam three parts, leaf mould one part, and sand.

Principal Species :—

Ahouai, 20′, Je., st., yel. (*syn.* Cerbera Ahouai).
neriifolia, 12′, st., Je., yel. (*syn.* Cerbera Thevetia). Exile Oil Plant.
Yccotli, 8′, st., close to neriifolia, fruits like small Apples.

THIBAUDIA.

Stove shrubs (*ord.* Vacciniaceæ), many of which are now referred to Agapetes, Cavendishia, and Pentapterygium (which *see*). Propagation, by cuttings, in sand, in a close frame. Soil, sandy peat. Both the species named are elegant plants, deserving a place in the stove.

Principal Species :—

floribunda, st. or warm grh., sc., lvs. leathery, oblong, lanceolate.
pichinchensis, 6′ to 12′, sc., lvs. oval.

THINNING.

The timely thinning out of superfluous plants is one of the vital points in the cultivation of annuals of which seed has been sown where they are to flower. If neglected a lot of spindly plants is the result, and these rarely flower satisfactorily. Even with thin sowing a subsequent thinning is essential. Half-hardy annuals receive their thinning out at pricking off time. Rows of Carrots, Onions, Parsnips, Beet, and other vegetables, have to be thinned at an early stage, or the crop is irretrievably damaged. It should not be attempted in dry weather, when the ground is hard, as the plants would break off instead of coming out.

STRELITZIA REGINÆ.

The best time is a few hours after a shower. Thinning by hand is advisable, but in many rural districts Parsnips are roughly thinned by the draw hoe, in the same fashion as field roots. The practice is not to be commended.

Thinning out the branches is a prime feature in the pruning of many fruit trees, especially standards. (*See also* PRUNING and GRAPE THINNING.) The thinning of shrubberies is an important feature in their upkeep, as crowding means the exclusion of light and air, and the development of weak growth and unhealthy plants, with possibly insect and fungoid attacks.

THLADIANTHA.

Greenhouse and hardy climbing herbs (*ord.* Cucurbitaceæ). Propagation, by seeds, sown in heat. Almost any garden soil will do, but a warm and sunny position is necessary.

Only Species Introduced :—

dubia, sum., hlf-hdy., flowers unisexual, yel., fruits red, very ornamental.

THLASPI. (BASTARD CRESS, PENNY CRESS, BESOM WEED.)

Although this is a moderately large genus (*ord.* Cruciferæ), the plants referred to it are practically all weeds, and none of them is worth growing in the garden. Alpestre, arvense, and perfoliatum are British weeds.

THOMASIA.

Greenhouse shrubs (*ord.* Sterculiaceæ), rarely seen in collections. Propagation, by cuttings of ripened shoots, in sand, in a close but not warm frame. Soil, equal parts loam and peat, with one-eighth sand.

Principal Species : –

macrocarpa, 3′, Je., red (*syn.* stipulacea of *Botanical Magazine* 4111).

purpurea, 2′, Je., pur., small, the calyx is the showy part (*syn.* Lasiopetalum purpureum of *Botanical Magazine* 1755).

solanacea, 4′, Je., wh., calyx the showy part (*syn.* Lasiopetalum solanaceum of *Botanical Magazine* 1486).

THOMAS'S PHOSPHATE.

This, commonly known as Basic Slag, is a by-product obtained in the smelting of iron. It has come into considerable favour of late as a phosphatic manure. The lime which it contains is in a caustic state, and it yields from 12 per cent. to 20 per cent. of phosphoric acid, together with quantities of magnesia, oxides of iron, silica, and manganese. It is found that it gives much the same results as superphosphate of lime, except that while the latter may be beneficially employed upon light soils, Thomas's Phosphate answers best upon heavy and sticky soils. Fruit trees, Roses, ornamental trees and shrubs, and lawns all stand to benefit by its use, about 4 oz. to the square yard being a good dressing. The value of the slag depends upon its fineness. A good sample will be as fine as dust. It should not be mixed with sulphate of ammonia or loss will result, but it may be mixed with nitrate of soda, if desired.

THOMSONIA.

A small and obscure genus (*ord.* Aroideæ) of tuberous rooted stove perennial herbs. They may be treated in the same way as the Caladiums.

Principal Species :—

nepalensis, 2′, spathe grn., spadix grn., flowers yel., lvs. trisected (*syn.* Hookeri).

THOUINIA (*syns.* THYANA and VARGASIA).

An obscure genus of climbing or erect shrubs and trees (*ord.* Sapindaceæ), rare in cultivation. Propagation, by cuttings in sandy soil in heat. Soil, equal parts loam and peat, with sand.

Principal Species :—

pinnata, 8′, Je., st. erect shr., wh.

THRINAX.

Dwarf stove Palms (*ord.* Palmæ) of great beauty. Large plants of excelsa and radiata make fine specimens for roomy houses; they do best in wooden tubs, or planted in borders. Propagation, by imported seeds sown in strong heat. Soil, for the younger plants loam and peat in equal parts, with sand; for the older ones rich turfy loam and sand. (*See also* PALMS.)

Principal Species :—

argentea, 12′ to 15′, lvs. silvery beneath. Broom Palm, Silver Thatch.

excelsa, 7′ to 10′, lvs. 5′ long, pale grn. above, glaucous below.

multiflora, 6′ to 8′, lvs. nearly round, with about forty segments (*syn.* graminifolia).

parviflora, 10′ to 12′, lvs. 2′ long. Palmetto Thatch, Royal Palmetto Palm.

radiata, lvs. 2′ long, split to two-thirds of their length (*syns.* elegans and gracilis of gardens).

Other Species : –

arborea (now Acanthorhiza arborea).

barbadensis, 12′, lvs. fan shaped, with many segments.

Morrisii, 3′, lvs. nearly round, glaucous beneath.

Pumilio, lvs. digitate, with many segments.

THRIPS.

The insects popularly known as Thrips (Heliothrips Adonidum) are most familiar and troublesome to the gardener. There are very few under-glass plants that are immune from their attacks. Neither are outdoor plants free, Peas especially affording them congenial food and shelter. Under glass sponge and syringe have to be constantly in use. Undoubtedly the regular syringing of foliage plants will do much to keep down attacks of thrips, although the insects have not that dislike to water that red spider has. Amongst the most useful remedies are Fir tree oil and kerosene emulsion (*see* INSECTICIDES). Fumigation is

Thistle (*see Carduus and Cnicus*).
Thistle, Blessed (*Silybum marianum*).
Thistle, Cotton (*Onopordon Acanthium*).
Thistle, Globe (*see Echinops*).
Thistle, Golden (*see Protea and Scolymus hispanicus*).
Thistle, Hedgehog (*see Echinocactus*).
Thistle, Holy (*Silybum marianum*).
Thistle, Melon (*see Melocactus*).
Thistle, Our Lady's Milk (*Silybum marianum*).
Thistle, Sow (*see Sonchus*).

Thorn (*see Cratægus*).
Thorn Apple (*see Datura Stramonium*).
Thorn Bloom (*see Ulex europæus*).
Thorn, Christ's (*Paliurus aculeatus and Zizyphus*).
Thorn, Egyptian (*Acacia vera*).
Thorn, Garland (*Paliurus australis*).
Thorn, Jerusalem (*Parkinsonia aculeata*).
Three Birds' Orchid (*Pogonia pendula*).
Thrift (*see Armeria maritima*).
Thrift, Prickly (*see Acantholimon*).

excellent, and this is the best method of combating thrips upon Ferns. Sponging with soapy water should follow the fumigations.

Thrips Phylloxeræ is in some measure a friend to the gardener. Its larvæ, which result from the eggs laid in the Phylloxera galls upon the Grape Vine, feed upon the Phylloxera, and destroy myriads of them.

THRYPTOMENE.

Heath-like shrubs (*ord.* Myrtaceæ) with small flowers. They may be treated like the Bæckeas, although they are not commonly found in collections. Probably saxicola is the only species that has been introduced.

Principal Species :—

saxicola, 4′, Jy., grh., wh.

THUJA, THUJOPSIS (*see* THUYA).

THUNBERGIA.

Evergreen stove or intermediate house climbers (*ord.* Acanthaceæ). Alata and its varieties are hardier than the rest, and make fine subjects for hanging baskets to decorate the conservatory or verandah. Propagation, by seeds sown in spring in light soil. They must be placed in a warm, moist atmosphere in a propagating case or over a gentle hotbed. Prick off and pot on the young plants as may become necessary. Cuttings may be rooted in sandy soil under a bell-glass over bottom heat in July. Soil, fibrous loam and peat, with a little thoroughly rotted manure and some sand. Thunbergias are attacked by red spider, and for this reason are best treated as annuals. When cultivated as perennials the growths require to be severely thinned out during winter. If crowded they soon become ineffective.

Principal Species and Varieties :—

alata, 5′, sum., yel.; fine vars. are alba, wh., and aurantiaca, or.
coccinea, 5′, Jy., sc.
erecta, 6′, Jy., bl., or.; alba is a fine wh., yel. var. (*syn.* Meyenia erecta).
fragrans, 5′, Je., wh., fragrant; the var. lævis has little odour.
grandiflora, 12′ to 20′, Jy., bl.; alba is a wh. var.
mysorensis, 10′, spr., yel., pur. (*syn.* Hexacentris mysorensis).

Other Species :—

affinis, 5′, Sep., vio., yel.
angulata, 4′, Je.
capensis, 4′, Je., yel.
chrysops, 3′, Je., bl., vio.
hawtayneana, 10′, Je., sc. (*syn.* Meyenia hawtayneana).
Kirkii, 3′, Sep., bl., vio.
laurifolia, 6′, sum., bl. (*syn.* Harrisii).
natalensis, 3′, Jy., bl.
vogeliana, 10′, sum., bl., vio. (*syn.* Meyenia vogeliana).

THUNIA.

Handsome and graceful stove Orchids (*ord.* Orchidaceæ). Flowers large, borne in pendent clusters. Though well known horticulturally as Thunias, botanists have now placed these plants under Phaius, of which genus they form the deciduous section. Propagation, by separation of the growths at potting time. Soil, equal parts fibrous peat and fibrous loam, with a little dried cow manure and sand. Half fill the pots with crocks. Pot when new growths appear, generally about February. Give little water until growth is vigorous, then increase the supply, subsequently giving weak liquid manure at every third watering. Syringe freely and provide plenty of heat. After flowering gradually reduce the water supply as the growth matures, finally withholding it during winter.

Principal Species and Varieties :—

[NOTE.—s. = sepals, p. = petals, l. = lip.]

alba, 2½′ to 4′, sum., s. and p. wh., l. wh., pur.; Dodgsoni, with l. marked yel., and nivalis, wh., are fine vars.
Bensonæ, 2¼′, sum., s. and p. deep pur., l. pur, wh., yel.
— winniana, larger, s. and p. deep ro., l. marked crim. pur.
Marshalliæ, 3′, sum., s. and p. wh., l. wh., or., yel. (*syn.* marshalliana).

Principal Hybrids :—

inversa (Bensonæ × Marshalliæ), deeper colour than veitchiana.
magnifica (brymeriana × Bensonæ).
superba (veitchiana × Bensonæ), s. and p. ro., mauve, l. wh., mauve, keeled yel.
veitchiana (Marshalliæ × Bensonæ), 2½′, sum., s. and p. wh., flushed pur., l. wh., marked rosy pur., or. yel.

Other Species :—

brymeriana, 3′, sum., s. and p. wh., l. wh., marked crim. pur., keels yel., red; probably natural hybrid (Marshalliæ × alba).
pulchra, 2½′, sum., s. and p. wh., l. wh., br., yel.
winniana (*see* Bensonæ var.).

THUYA (including THUYOPSIS and BIOTA).

Description.—Hardy evergreen ornamental trees or shrubs (*ord.* Coniferæ), of service for parks and pleasure grounds, while the smaller varieties of occidentalis may be used on large rockwork. They have unisexual flowers, the fruit being produced singly at the end of short branchlets, and pendulous. By some authors Biota and Thuyopsis have been considered distinct genera. They are divided into Euthuya, with pendulous cones, scales not thickening upwards, and bearing two- to three-winged seeds, *e.g.* T. occidentalis, T. gigantea, and T. japonica; Biota, cones erect, with thickened scales prolonged at the apex into a curved or horn-like process, and bearing two wingless seeds, *e.g.* T. orientalis; Thuyopsis, cones sub-pendulous, with scales much thickened at the apex, and bearing four- to five-winged seeds, *e.g.* T. dolabrata. The very ornamental dolabrata makes a good lawn tree. Gigantea is a tall, cone-like tree with branches to the base where it has space; its timber is largely used in North America.

Propagation.—By seeds sown under glass in spring, the seedlings being afterwards planted in beds; also by cuttings in a cold frame in August, or at other times in heat, under bell-glasses.

Soil.—A moist, retentive loam.

[NOTE.—The synonymy is that of the *Manual of the Coniferæ*.]

Principal Species and Varieties :—

dolabrata, 50′, branches horizontal or depressed, lvs. in four rows, in pairs, silvery beneath, cones eight to ten scales (*syns.* Thuyopsis, Thujopsis, or Thuiopsis dolabrata). Japanese Thuya.
— lætevirens, dwarf shr., branchlets slender, lvs. small (*syn.* nana).
— variegata, tips generally pale yel. or cream.
gigantea, 150′, branches close set, spreading, lvs. in decussate pairs, yel., grn. on upper side, darker on lower, cones in clusters on ends of branchlets, eight to ten scales (*syns.* plicata of Don and Menziesii).
— atro-virens, dark grn.
— aurea, light yel. (*syn.* variegata).
— aureo-variegata and aurescens resemble above.

Thrixspermum (*see Sarcochilus*).
Throatwort (*see Campanula Trachelium*).
Thunder Plant (*see Sempervivum Tectorum*).

— erecta, more upright.
— gracilis, smaller, more slender, lvs. small.
— pumila, more diffuse habit.
japonica, 30′, branches short, spreading, lvs. in decussate pairs, pale grn. with wh. spots on lower side, cones of four pairs of scales (*syns.* Standishii, gigantea of Palatore, not Nuttall, gigantea, var. japonica, and Thuyopsis Standishii of gardens). Japanese Arbor-Vitæ, Standish's Arbor-Vitæ.
occidentalis, 60′, branches short, spreading lvs. in opposite pairs, small, dull yel., grn., cones eight to ten scales. Arbor-Vitæ, White Cedar.
— dumosa, 2′ to 3′, dense (*syn.* pygmæa).
— ellwangeriana, dwarf, between type and ericoides.
— ericoides, dwarf, rounded shr. of pretty habit.
— lutea, low tree, branchlets of current year yel.
— nana, dwarfer form.
— pendula, primary branches drooping.
— plicata, smaller, branches shorter, branchlets taking an erect position (*syn.* plicata).
— argenteo - variegata, variegated wh.
— aureo-variegata, variegated yel.
— Spathii, curious form, young branchlets crowded.
— vervæneana, smaller, denser, branchlets tinged golden yel. to brownish or., then grn.
— wareana, dwarf tree, denser than type, branches short, lvs. brighter, deeper grn.
— wareana aurea, many branchlets yel., changing to light grn. in win. (*syn.* plicata aurea).
orientalis, 25′, branches spreading, afterwards ascending, lvs. in four rows, bright grn. in sum., brownish in win., cones of six or eight scales with horn-like ends (*syn.* Biota orientalis). Chinese Arbor-Vitæ. Many vars., the following being among the best:
— argenteo - variegata, variegated cream, but inconstant.
— aurea, dwarf shr., growths yel. in spr. (*syns.* T. aurea and Biota orientalis aurea).
— aureo-variegata, habit of type, some branchlets light yel.
— decussata, dwarf erect grower (*syns.* Biota orientalis decussata and Retinispora juniperoides).
— elegantissima, dwarf, fastigiate habit, branchlets yel.
— funiculata, branchlets slender (*syn.* intermedia).
— japonica, broad, spreading form (*syn.* falcata).
— meldensis, low tree, upright, flexible branches, lvs. pointed (*syns.* Biota orientalis meldensis, Retinispora meldensis, and Thuya hybrida).
— pendula, branches lengthened into drooping, rope-like extremities, very distinct (*syns.* pendula, filiformis, Biota pendula, B. orientalis pendula, and B. o. filiformis).
— pygmæa, very dwarf, a few inches high (*syn.* Biota dumosa).

THYMBRA.

Half-hardy evergreens (*ord.* Labiatæ) of small importance. Propagation, by seeds in spring or cuttings in summer. Soil, light, sandy loam.

Principal Species:—

spicata, 1½′, Je., pur.

THYME.

Thymus vulgaris is a valuable aromatic herb (*ord.* Labiatæ), largely used for seasoning and flavouring. Propagation, by seeds sown in the open in April. Afterwards thin or transplant the seedlings to 1′ apart. It may be increased by division in spring, or by cuttings in autumn, though the latter are seldom necessary. Any good garden soil and a sunny position suit. Lemon Thyme (citriodorus) has yellowish green variegation and a distinct Citron fragrance. As a border or edging plant it is of great value, and its culinary uses are many. It is, however, less hardy in cold, wet districts than the common Thyme, and is not raised from seed. In damp and cold localities it is a good plan to lift, pot, and protect a few plants each autumn, propagating from these in spring in warmth; or a batch of cuttings may be inserted in autumn, and kept in a cold frame. In warm, dry districts the Lemon Thyme will survive the winter, and may be increased by division in spring. (*See also* THYMUS.)

Thylacantha (*see Angelonia*).
Thyme, Basil (*Calamintha Acinos*).

THYMELÆA.

Half-hardy or hardy shrubs (*ord.* Thymelæaceæ). Propagation, by cuttings in light soil under a hand-glass. Soil, peat and loam.

Principal Species:—

arvensis, 1½′, aut., yel. (*syn.* Stellera Passerina).
hirsuta, 2′, Jy., wh. (correctly Passerina hirsuta).

THYMUS. (*See also* THYME.)

Dwarf sub-shrubs or shrubs (*ord.* Labiatæ) of pleasing fragrance. Some have pretty foliage. Many known in gardens by this name are properly Calaminthas, which *see*. Propagation, by cuttings, division, or slips, under a hand-light; also by seeds sown in spring. Common soil, though several prefer one of a sandy character.

Principal Species and Varieties:—

azoricus, 3″, sum., pur., rockwork.
citriodorus, 9″, Je., sum. (*syn.* Serpyllum vulgaris). Lemon-scented Thyme.
— aureus, 9″, yel. variegation.
— Fraser's Silver Variegated, very pretty.
Serpyllum, Je., prostrate, rosy pur. Wild Thyme, Brotherwort.
— albus, wh.
— atropurpureus, pur.
— coccineus, red.
— lanuginosus, lvs. woolly. (*syn.* lanuginosus).
— rotundifolius, lvs. rounded.
— variegatus, lvs. variegated.
— vulgaris (*see* citriodorus).
vulgaris, 6″, Je., pur. Garden Thyme.

Other Species and Varieties:—

bracteosus, sum., pur.
Chamædrys, 3″, sum., pale pur.
— montanus, more erect (*syn.* nummularius).
corsicus (now Mentha Requieni).
lanuginosus (*see* Serpyllum lanuginosus).
mastichina, variable, sum., wh.
striatus, sum., prostrate, pur.
Zygis of Sibthorp (*see* striatus).

THYRSACANTHUS.

Free-flowering stove evergreen shrubs or herbs (*ord.* Acanthaceæ). Propagation, by cuttings of the young basal growths in sand under a bell-glass over bottom heat. Soil, fibrous peat and loam, with a little manure and coarse sand.

Principal Species:—

lemairianus, 3′, Feb., red (*syn.* Eranthemum coccineum).
rutilans, 2½′, win., sc., crim.

Other Species:—

barlerioides, 2′, spr., red.
bracteolatus, 2′, Jy., red.
callistachyus, 2′, Jy., red (*syn.* lilacinus).

THYRSOPTERIS.

Elegans, the only species (*ord.* Filices), is a rare greenhouse Tree Fern, growing 10′ to 15′ high. The fertile portion of the fronds is so constructed as to form a dense bunch. Propagation, by spores. Soil, peat, loam, and sand.

THYSANOTUS.

Greenhouse herbaceous perennials (*ord.* Liliaceæ), not commonly seen in cultivation. Propagation, by division. Soil, loam, leaf mould, and sand.

Principal Species :—

dichotomus, 9″, Jy., pur.
junceus, 1½′, Aug., pur.
multiflorus, 1′, Aug., pur.

TIARELLA. (Foam Flower, False Mitrewort.)

Four species of hardy perennial herbs (*ord.* Saxifrageæ), of which the best, and the only one introduced, is cordifolia, 6″ to 12″, April, white, a beautiful plant for the front of the border or the rockery. It has small flowers in racemes, and

Tiarella cordifolia.

rather heart shaped, lobed leaves. Of the two forms, that which runs a great deal at the roots is inferior. Propagation, by division. It will grow in common soil, but likes moist peat.

TIBOUCHINA (*syns.* Lasiandra and Pleroma).

Intermediate house evergreen shrubs (*ord.* Melastomaceæ), often of straggling habit, and suitable for training to the rafters. Propagation, by cuttings of firm side shoots in summer, in very sandy soil, beneath a bell-glass over bottom heat. Soil, fibrous peat and loam, with plenty of sharp grit and a little charcoal. Perfect drainage is essential, carefully avoiding stagnant moisture at the roots.

Principal Species :—

elegans, 6′, Je., pur.
heteromalla, 5′, Jy., bl., pur. (*syns.* Melastoma and Pleroma heteromallum).
semidecandra, 8″ to 20″, Jy., pur. (*syn.* Pleroma macranthum).

Other Species :—

benthamiana, 6′, Aug., vio. pur. (*syn.* Pleroma kunthianum).
gaudichaudiana, 6′, sum., ro., vio. (*syn.* Lasiandra petiolata).
holosericea, 6′, Jy., pur. (*syn.* Lasiandra argentea).

TICKS.

Strictly these are not insects, but belong to the Acarida, or Mites. There are several genera, the chief of them being Ixodes. Although these Mites are to be found on low-growing herbs, and apparently feed thereon, they are ever ready to attach themselves as parasites to various animals, including man. They frequently give trouble to gardeners in autumn. Washing with tobacco water is an excellent remedy.

TICOREA.

Stove evergreen trees or shrubs (*ord.* Rutaceæ). Propagation, by cuttings of ripened growths in sand under a bell-glass. Soil, fibrous loam and sandy peat.

Principal Species :—

fœtida, 12′, Feb., wh.

TIGER LILY (*see* Lilium tigrinum).

TIGRIDIA. (Tiger Flower.)

Bulbous plants (*ord.* Irideæ), that flourish on a warm border, or may be grown in a cool greenhouse. Propagation, by offsets, or by seeds sown in spring in the greenhouse. Soil, a rich, deep, light loam. Unless the position is very favourable some protection is desirable in winter; or after the foliage has died down the bulbs may be lifted, stored in a dry place, and replanted in April.

Principal Species and Varieties :—

buccifera, 1′, sum., yellowish grn., pur.
Pavonia, 1½′, Je., or. red.
— aurea, yel.
— alba, wh.
— conchiflora, deep yel.
Pringlei, 1½′, sum., sc., or., crim.
violacea, 1′, My., rosy pur., wh. (*syn.* Beatonia purpurea).

TILIA. (Lime Tree, Linden.)

Fine, tall-growing trees (*ord.* Tiliaceæ), with white or yellowish flowers and Nut-like fruit. They make handsome avenues, their principal fault being the early period at which the leaves assume their autumnal colouring. The timber of platyphyllos and vulgaris is used by cabinet makers on account of its fine grain. From the inner bark of several is produced the material from which garden mats are made. The flowers are largely frequented by bees. Propagation, by layering in autumn or winter; the varieties by grafting on the common species. Soil, good loam, not too dry.

Thysanoptera (*see Thrips*)
Tiaridium (*see Heliotropium*).
Tickseed (*see Coreopsis*).
Tigarea (*see Purshia*).
Tiger Iris (*see Tigridia*).
Tigris, Flower of (*see Tigridia Pavonia*).
Tile Root (*see Geissorhiza*).

Principal Species and Varieties :—

[NOTE.—The synonymy is that of the *Kew Hand-List*.]

argentea, 50′, Je., yellowish wh., lvs. heart shaped, wh. beneath (*syns.* alba [of gardens in part, not of Aiton], americana pubescens, europæa alba heterophylla, and pubescens Parmentieri [all of gardens], rotundifolia, and tomentosa). Silver or White Lime.
— orbicularis, lvs. thick, rather rounded.
dasystyla, 60′, sum., lvs. large, blunt or heart shaped at base, hairy beneath (*syns.* euchlora and europæa dasystyla).
petiolaris, 40′ to 50′, yellowish wh., lvs. wh. underneath, on long petioles, branches drooping. Crimean Lime.
platyphyllos, 90′, Je., yellowish wh., lvs. downy underneath, sometimes on upper surface (*syns.* americana [of gardens, not of Linnæus], cordifolia, europæa [in part], grandifolia, mollis, mutabilis, neglecta [of gardens, not of Spach], and pauciflora).
— aspleniifolia, lvs. laciniated (*syns.* laciniata and grandifolia laciniata).
— aurantia, bark of young twigs yel.
— blechiana, lvs. large.
— corallina, the young branches red in win. (*syns.* corallina and spectabilis).
— obliqua, lvs. oblique at base (*syns.* Beaumontii, Hostii, and obliqua).
— oxycarpa, fruit with five sharp ribs, lvs. strongly toothed (*syns.* cordifolia var., oxycarpa, and europæa glauca).
— pendula, branches drooping.
— pyramidalis, pyramidal habit.
— tortuosa, branches twisted.
— vitifolia, lvs. Vine-like (*syns.* pyramidalis, vitifolia, grandifolia var. vitifolia, and vitifolia).
vulgaris, sum., yellowish wh., lvs. glabrous above (*syns.* corylifolia, europæa [in part], glauca, hollandica, hybrida, intermedia, and præcox). Common Lime or Linden.
— variegata, lvs. blotched dull wh. (*syn.* europæa variegata).

Other Species :—

americana, 70′, Jy., yellowish wh., lvs. heart shaped, serrated (*syns.* canadensis, caroliniana, glabra, hybrida superba, latifolia, longifolia dentata, etc.). American Bass or White Wood.
cordata, 50′, sum., yellowish-wh., lvs. heart shaped, glabrous (*syns.* microphylla, parvifolia, sylvestris, and ulmifolia).
heterophylla, 50′, Jy., greenish yel., lvs. oblique, heart shaped (*syns.* alba, americana heterophylla, laxiflora, and macrophylla). American White Basswood.
pubescens, 60′, Jy., buds yellowish wh., lvs. at first pubescent (*syn.* americana pubescens).

TILIACORA.

The only species is a stove evergreen shrub (*ord.* Menispermaceæ) of climbing habit. It may be multiplied by cuttings, rooted in sand, in heat, in a close frame. Soil, sandy loam and peat in equal parts.

Only Species :—

racemosa, My., st., yel., in panicles 6″ to 12″ long, fruits red.

TILLANDSIA.

A large genus of American plants, mostly stove epiphytes (*ord.* Bromeliaceæ). Many have handsome foliage, and nearly all have very showy bracts. Propagation, by seeds or suckers. The latter are removed from the parent in spring, potted singly in very porous compost, and kept shaded until well rooted. Soil, peat, loam, and sand, with crushed potsherds. Usneoides, bulbosa, and ixioides need to be fastened to blocks of wood, with a little sphagnum about their roots.

Principal Species :—

[NOTE.—bt. = bracts.]

anceps, 9″, spr., yellowish bl., wh., bt. greenish yel. (*syn.* Vriesia anceps).
Barilletii, 1½′, sum., yel., bt. yellowish grn. (*syns.* Vriesia Barilletii and V. crotalophora).
bulbosa, 6″, aut., bl. (*syn.* pauciflora). Picta and pumila are good vars.
carinata, 8″, Nov., yel., bt. grn., sc. (*syns.* brachystachys and Vriesia carinata).
corallina, 1′, sum., grn., crim. pur., bt. grn., crim. pur. (*syn.* Vriesia corallina); several vars.
Duratii, 10″, aut., vio., bt. silvery grn. (*syns.* circinalis and revoluta).
duvaliana, 1′, sum., yellowish grn., bt. sc., grn. (*syn.* Vriesia fulvida).
flexuosa, 2½′, aut., ro. (*syn.* aloifolia).
hieroglyphica, 2½′, aut., lvs. grn., marked pur.
Lindeni, 1′, sum., bl., bt. car., grn. (*syn.* morreniana); the var. major has large bl. and wh. flowers.
Morreni, 1¼′, aut., yellowish grn., bt. pale yel.
psittacina, 1′, Jy., grn., bt. sc., yel. (*syn.* Vriesia psittacina); morreniana is a good var.
pulchella, 8″, Oct., wh., grn., bt. light red.
Regina, 4′ to 7′, aut., wh., bt. ro., fragrant (*syn.* Vriesia gigantea).
splendens, 2′, aut., yel., bt. pur. (*syns.* picta, speciosa, and zebrina).
tessellata, 2′, aut., greenish yel., bt. grn., lvs. greenish yel. (*syn.* Vriesia tessellata); several good vars., notably parisiense and Sanderæ.
usneoides, Jy., greenish red, forms long drooping masses of silvery grey growths.
Zahnii, 1′, spr., yel., bt. sc. (correctly Caraguata Zahnii).

Principal Hybrids :—

cardinalis (psittacina × Krameri), 1½′, win., yel., bt. crim.
Duchartrei (Barilletii × splendens), 1½′, sum., yel., bt. crim.
Henricii (splendens × splendida), 1½′, aut., yel., bt. red, pur.
Nanoti (fulvida × Morreni), 1′, aut., yel., bt. red.
retroflexa (psittacina × scalaris), 1¼′, aut., yel., bt. red.
Rex (Barilletii × cardinalis), 1′, spr., yel., bt. crim.
splendida (duvaliana × incurvata), 1′, aut., yel., bt. red.

Other Species :—

aloifolia (*see* flexuosa).
amethystina, 1½′, sum., yel., bt. greenish yel. (*syn.* Vriesia amethystina).
balbisiana, 1′, aut., vio., bt. ro.
Caput-Medusæ, 1¼′, aut., grn.
chrysostachys, 1′, aut., yel. (*syn.* Vriesia chrysostachys).
circinalis (*see* Duratii).
dianthoidea, 1′, aut., bl., bt. rosy pur. (*syn.* stricta of *Botanical Register* 1338); the var. rosea has wh. flowers and rosy pk. bt.
distachya, 1′, win., wh., bt. grn.
erubescens of gardens (*see* ionantha).
fenestralis, 1′, aut., yel. (*syn.* Vriesia fenestralis).
gigantea (*see* Regina var.).
gladioliflora, 1′, aut., greenish vio., bt. grn. (*syn.* Vriesia gladioliflora).
glaucophylla, 1½′, Aug., greenish wh., pur., bt. red, grn., yel. (*syn.* Vriesia glaucophylla).
guttata, 2½′, aut., yel., bt. ro. (*syn.* Vriesia guttata).
hamaleana, 1′, aut., grn., wh., bt. grn., pur.
ionantha, 4″, aut., vio. (*syn.* erubescens of gardens).
morreniana (*see* Lindeni).
rodigasiana, 6″, aut., yel., bt. red (*syn.* Vriesia rodigasiana).
scalaris, 1½′, grn., yel., bt. ro. (*syn.* Vriesia scalaris).
stricta, 8″, Nov., vio., reddish br., bt. wh., red.
xiphioides, 6″, spr., wh., lvs. silvery grey. Arequitæ is a good var.

TILLETIA.

One species of this genus of minute Fungi is common in many corn-growing districts, attacking the ovaries of Wheat flowers and causing the grains to turn dull green when ripe. Bunt and Stinking Rust are common names for the disease; the latter is given because when ripe, affected grains are crushed they are greasy and give off an obnoxious odour. Other species of Tilletia attack Rye, Lolium, and other Grasses. If the grain is soaked in a 1 per cent. solution of carbolic acid in water the pest will be destroyed.

TIMONIUS.

Evergreen stove trees (*ord.* Rubiaceæ). Propagation, by cuttings in a close case. Soil, three parts fibrous loam, one part peat, and coarse sand.

Principal Species :—

Rumphii, 12′, sum., wh.

TINANTIA.

Half-hardy perennial herbs (*ord.* Commelinaceæ). Propagation, by division in spring, or by cuttings. Soil, light, rich loam.

Principal Species :—

fugax, 15″, Jy., pur. (*syn.* Tradescantia erecta of *Botanical Magazine* 1340.)

TINEA.

A large genus of small moths that seldom do any harm in gardens, but are destructive to clothing and furniture. Belonging to the same division (Tineina) is the allied genus Hyponomeuta, which contains the Small Ermine Moth (which *see*). This is sometimes known as Tinea padella, and causes much destruction to Apples, Pears, and Hawthorns, chiefly by eating the flowers in spring.

TINNEA.

Stove herbs or sub-shrubs (*ord.* Labiatæ). Propagation, by cuttings in sandy soil. Soil, fibrous loam and leaf soil, with a little manure and sand. Pinch out the growing points to induce bushy growth.

Principal Species :—

æthiopica, 3′ to 6′, win., crim. pur.

TIPULA. (Daddy Long Legs.)

This genus of flies (*ord.* Diptera) contains one well-known species, T. oleracea, which in the adult stage is popularly called the Crane Fly or Daddy Long Legs. It is one of the worst of garden pests, its grubs—known as Leather Jackets because of their tough, greyish skins—doing a great deal of damage to various members of the Cabbage tribe (Brassicas), and to lawns, by eating the roots, just below the surface of the soil. Pieces of Potato, Carrot, or Parsnip, slightly hollowed, and with a skewer attached, make good traps if set 1″ or so below the surface of the soil; they must be examined every day, the skewers serving to indicate their positions. After the removal of crops from an infested area, a heavy dressing of gas lime, lightly forked in, will answer for any grubs remaining. Infested lawns are improved by frequent rolling with very heavy rollers, and by the application of such surface dressings as will stimulate and assist growth. Light dressings of soot and salt prove both beneficial to Brassica crops and distasteful to the Crane Fly grubs.

TIPULIDEÆ. (Leather Jacket Grubs.)

These two-winged flies (*ord.* Diptera) have long, slender bodies, very long and ungainly legs, rather narrow, much veined wings, small, round heads, and long antennæ. Their larvæ are very destructive to pastures and garden crops generally. The name of Leather Jackets has been bestowed upon these grubs, in allusion to their very leathery skin. They are dirty grey in colour, cylindrical in shape, and very sluggish in movement. The most common species is oleracea, popularly known as the Crane Fly and Daddy Long Legs. The larvæ of this species are about 1″ long, and they are often present in great numbers, particularly in damp soil. The pupæ are about the same size.

Various remedies may be tried. Trapping by means of slices of Potatoes or Turnips is efficacious. Digging up the ground and encouraging starlings, rooks, and domesticated fowls to clear out some of the grubs is also excellent. Dressing with common salt, gas lime, and soaper's ashes is another item, and the destruction of rubbish heaps where the pests breed is likewise highly important. Weedy plots in field and garden are a source of considerable trouble; the Crane Flies haunt them. The remedy is obvious.

TITHONIA.

Stove annuals (*ord.* Compositæ). Propagation, by seeds. Soil, rich, fibrous, sandy loam.

Principal Species :—

speciosa, 4′, Aug., yel. (*syn.* Helianthus speciosus).
tagetiflora, 6′ to 8′, Aug., yel.
tubæformis, 5′, Jy., yel. (*syn.* Helianthus tubæformis).

TOADSTOOLS.

Popularly, all those Fungi that produce an umbrella shaped growth above ground—somewhat like that of the edible Mushroom—but which are either unfit for food or distinctly poisonous, are known as Toadstools.

TOADS.

The toad (Bufo vulgaris) has been unkindly treated by popular report. The idea that it is venomous, and to be destroyed on sight, is still widespread. The truth is that it is not only a harmless animal, but a great friend to the gardener by reason of the quantities of slugs and insects which it disposes of. Usually a night feeder, a dull day will also find it active, and although it appears to be very slow in its movements, the lightning-like rapidity with which its tongue is darted to and fro is sufficient to account for even the most agile insects. It is a capital plan to place a toad or two in Cucumber and Melon pits and frames, and they should never be destroyed in the garden. Toads may be distinguished from frogs by the heavier body, much darker colour, and dull mottlings.

TOBACCO.

The species of Tobaccos most commonly used in this country are Nicotiana Tabacum (*ord.* Solanaceæ), the ordinary Tobacco, and rustica, the

Tithymalus (*see Euphorbia*).
Tittmannia (*of Reichenbach, see Vandellia*).
Toadflax (*see Linaria*).
Toadflax, Ivy-leaved (*see Linaria Cymbalaria*).
Tobacco, Mountain (*Arnica montana*).
Tobacco, Rock (*Primulina Tabacum*).

Turkish Tobacco. In its various forms Tobacco is one of the most valuable insecticides at the gardener's command. The fumigation of the contents of glasshouses for the destruction of green fly and other insects by means of the smoke of burning Tobacco paper, Tobacco rag, or the article itself is well known. Tobacco water may be made by steeping 2 oz. to 4 oz. of coarse shag in 1 gallon of boiling water. Tobacconist's liquor, sometimes obtainable, may be diluted with five times its bulk of water. Plants infested with aphides may be sprayed with either of the above liquids, or dipped in them. The extract, nicotine, in various forms, is vaporised in houses infested with insects. Two of the best of these are XL All Vaporiser and the Lethorion cones. MacDougall's fumigating sheets are also serviceable. (*See* FUMIGATING and NICOTIANA.)

TOCOCA.

Stove shrubs (*ord.* Melastomaceæ), valued for the beauty of their handsome leaves, which are variously tinted at different stages of growth. Propagation, by cuttings getting firm in sandy peat in a close case. Soil, equal parts loam and peat, with sand. The best in cultivation is latifolia, pink or rose.

TOCOYENA.

A small genus of stove shrubs (*ord.* Rubiaceæ), allied to Posoqueria. Propagation, by cuttings of half-mature wood in sand in a close case. Soil, peat, with one-third of fibrous loam and sand.

Principal Species :—

longiflora, 6′, yel. and wh.

TODAROA (of PARL.).

A tall, perennial, greenhouse herb (*ord.* Umbelliferæ). The leaves are similar to Ferulas. Propagation, by seeds, offsets, or suckers. Soil, sandy loam, with a little peat. Aurea, 4′ to 6′, yellow, is the only known species.

TODDALIA.

Stove shrubs (*ord.* Rubiaceæ) with evergreen foliage and white flowers. Propagation, by cuttings in sand in a warm case. Soil, sandy, fibrous loam and one-fourth of leaf mould, with sand.

Principal Species :—

aculeata, 3′ to 6′ (*syn.* Scopolia aculeata).

TODEA.

Greenhouse and half-hardy Ferns (*ord.* Filices), mostly of filmy texture, and classed with Filmy Ferns. Barbara is the sole representative of the leathery leaved type, and has lately become popular as a market Fern by reason of the capability of the leaves to resist a dry atmosphere. Young plants make useful and ornamental subjects for decorative purposes in various ways. Superba is the best known representative of the type with membranous fronds. This and hymenophylloides may be grown in a cold frame in a shady position, or in close cases with Trichomanes. They must be kept rather dry overhead during the winter months, to avoid the damping of the fronds. Propagation, by spores. All have erect stems, often becoming elongated like Tree Ferns in the case of the filmy species, with a single crown. Even barbara, which ultimately develops into a mass weighing a hundredweight or more, takes years to develop separate crowns. Soil, fibrous loam with a third of leaf mould and sand. Some cultivators add a little chopped sphagnum to the compost.

Principal Species :—

barbara, fronds 1′ to 6′ long, 6″ to 12″ broad (*syns.* africana and rivularis).
— bipinnatifida, fronds light grn., elegant.
hymenophylloides, fronds 1′ to 2½′ long, 8″ to 12″ broad (*syn.* pellucida).
intermedia, fronds 1′ to 1¾′ long, 6″ to 8″ broad.
Moorei, fronds 1′ to 1½′ long, 8″ to 9″ broad; by some considered a hybrid (*syn.* grandipinnula).
superba, fronds 2′ to 4′ long, 5″ to 10″ broad. The best.
— plumosa, dwarf, plumy.

Other Species :—

africana (*see* barbara).
Fraseri, fronds 1′ to 2′ long, 8″ to 12″ broad.
grand pinnula (*see* Moorei).
pellucida (*see* hymenophylloides).
rivularis (*see* barbara).
wilkesiana, fronds larger, lower pinnæ shorter than Fraseri.

TOFIELDIA.

A small genus of hardy perennial herbs (*ord.* Liliaceæ), closely allied to Narthecium. Propagation, by division in spring. Moist, peaty soil.

Principal Species :—

calyculata, 4″ to 6″, grn., wh.
palustris, 3″ to 6″, grn., wh. (*syns.* alpina and borealis).

TOLMIEA (*syn.* LEPTAXIS).

A hardy perennial herb (*ord.* Saxifrageæ), closely allied to Heuchera. The heart shaped leaves develop young plants on the base of the leaf blades, on the upper surface. Propagation, by division and by the plantlets that arise upon the leaves Any well-drained soil.

Only Species :—

Menziesii, 8″ to 24″, Ap., grn., wh. (*syns.* Heuchera and Tiarella Menziesii).

TOLPIS.

Hardy annuals (*ord.* Compositæ), allied to Lapsana. Propagation, by seeds in the open border in April. Any well-drained garden soil. The best known is barbata, 1′ to 2′, June, yellow, purple (*syn.* Crepis barbata). Yellow Garden Hawk's-beard.

TOMATO.

Description.—This well-known and popular fruit, Lycopersicum esculentum, is a member of the Solanum or Potato family (Solanaceæ).

Propagation.—Generally by seeds, though cuttings are used for the production of winter and early spring crops. Seeds are sown in January in a temperature of 60° in well-drained pans of sandy soil for early indoor crops, and in March for obtaining strong plants for fruiting outdoors. Early pricking off should be practised in both cases; the young plants should never be allowed to become pot-bound, and should be kept in an airy situation near the glass to promote a sturdy growth.

Soil.—Any light, sandy soil will grow good Tomatoes, but liberal feeding is necessary after the fruits commence to set.

Culture Indoors.—Good crops may be obtained by skilful growers in large or small pots, shallow

Tobolewskia (*see Sobolewskia*).
Toddy Palm (*Caryota urens*).

Tolu Balsam Tree (*Myroxylon toluiferum*).
Tomato, Cannibal's (*see Solanum Uporo*).

boxes, or from plants in beds and borders. Pot culture is probably the best general method, pots of 10″ being used, and only two-thirds filled with soil until the fruit is set, when they may be filled in two operations with good loam. Stopping is practised by some growers when the first bunch of fruit is set, to promote early maturity of the fruit. Water should be liberally given to established plants, as well as copious supplies of liquid manure. Great care should be exercised to keep the atmosphere of the house dry and moving, as moisture laden, badly ventilated surroundings are the cause of disease. The plants should be confined to single stems, grown 18″ apart, assisted to set their fruit by gently tapping the stems at midday when the flowers are open, and should have all impeding and overreaching foliage removed when the fruit is ripening. Severe defoliation is not advisable.

Culture Outdoors.—Strong plants from 5″ or 6″ pots may be placed in sunny positions outside about the first week in June. They may be planted against a wall or fence, or in rows 3′ apart, each being supported with a stout stake. Summer culture will consist chiefly of removing side shoots and superfluous foliage, giving the plants water and liquid manure as required, and keeping the growths well secured to the stakes. Any fruit not ripe on the approach of frost may be finished in a warm room, sunny window, or on a greenhouse shelf.

Winter Culture.—This is not practised to any great extent, as the results rarely justify the expense incurred. Cuttings are struck in August in small pots, and grown on until they reach the fruiting stage in 10″ pots. All side shoots are regularly removed, a buoyant temperature of 60° is maintained, and feeding and watering are carried out carefully. Cuttings are also inserted in September for the production of early spring crops; or plants may be raised from seed.

Diseases.—*Black Spot* (Macrosporium Tomato), causing black blotches on the fruit, may be prevented by using Bordeaux Mixture, Veltha, or sulphide of potassium, ½ oz. to 1 gallon of water. There is no cure, and affected fruits should be burned as soon as noticed.

Spot Fungus (Cladosporium fulvum) generally attacks the lower leaves first, and thence spreads to the fruits. All affected leaves should be burnt, and the plants syringed with the remedies recommended above. Keeping the house dry, and allowing the temperature to run up to 110° for a few days, are helpful.

Sleepy Disease.—This (Fusarium Lycopersici) affects the stem of the plant, cutting off the supply of sap, and causing an early collapse. There is no cure, but beneficial results follow an application of ¼ lb. of basic slag phosphate and 4 oz. of kainit to 1 square yard of soil. Veltha may also be used.

White Fly.—This ofttimes troublesome pest should be attacked by fumigating on three successive evenings, or with Calvert's carbolic soft soap.

Selection of Varieties:—

For Indoors.—Perfection, Frogmore Selected, Holmes's Supreme, Ham Green Favourite, Golden Nugget, Golden Queen, and Chemin Rouge.

For Outdoors.—Comet, Earliest of All, Laxton's Open Air, and Early Ruby.

TOOLS.

A clean, bright tool performs its work much more easily than one that is rusted and dirty, therefore every effort should be made to keep all tools perfectly clean. The first step is to make each person responsible for the state of the tool he uses; thus each man should have his allotted spade, fork, broom, and hoe. All tools should have their proper places, so that an inspection is easily made, or a required implement readily found. The quickest way of cleaning dirty tools is to use a pail of water and a scrubbing brush; if the tools are stood near the flue in the stokehole they will quickly dry, and may be rubbed with an oily rag before putting them in their places. This applies to the smaller tools; such as rollers and mowing machines may be cleaned with a stiff broom and brush, taking care to remove all grass from the latter when its services are only requisitioned once a week. When stored for the winter, all tools should be thoroughly cleaned, carefully oiled, and stored in a dry place to ensure their being in good condition when next required. The mowing machine, being the most complicated of the garden tools, requires especial care in this respect. No tool should ever be put away with any of its parts broken, or such breakage will probably be forgotten, and disappointment follow the attempted use of the tool in a case of emergency.

Tools useful in every garden are Asparagus knife, bill-hook, edging iron, budding and pruning knives, forks (hand, dung, and digging), garden reel, hammer, hoes (Dutch and draw patterns), rakes (two sizes), spade, trowel, sécateurs, hone and rubber for sharpening, shears (edging and clipping), shovel, syringe, water cans (at least three sizes), lawn mower, roller, scythe, hand- and wheel-barrow, sulphur distributor, pail, lawn marker for tennis, crowbar, dibber, Daisy grubber, tree pruner, Grape scissors, saws (hand and pruning), pruning hook, sieves, ladders, steps, and a lamp. To these may also be added garden engine, water barrow, hose and reel, thermometer, trug baskets, flower baskets, pickaxe, mallet, rammers, grub axe, turf beater, and turf cutter.

TOOLHOUSE.

Only in large establishments is it possible to set aside a house especially for tools. Much can be done, however, to render any dry room used for other purposes suitable for the accommodation of the smaller garden implements by a liberal insertion of nails and hooks in the walls, or by forming racks on them made of looped hoop iron. Where a building is sufficiently high, a few strips of wood nailed across the rafters of the roof make a very handy rack for holding rakes, hoes, and forks. In buildings with wooden sides useful racks for tools of the spade and edging iron class may be made by nailing strips of wood to the vertical rafters, from 1′ to 2½′ from the ground.

TOP-DRESSING.

This forms a very useful and convenient alternative to repotting or replanting. It consists in removing a portion of the inert surface soil

Tongue Grafting (*see Grafting*).
Tongue Grass (*Lepidium sativum*).
Tongue Violet (*Schweiggeria fruticosa*).
Tonquin Bean (*Dipteryx odorata*).
Toothache Tree (*see Xanthoxylum*).
Toothwort (*see Dentaria and Plumbago*).

from around a tree or plant, and replacing it with fresh, rich compost. Many pot plants, such as Lilies, Tomatoes, and Chrysanthemums, are started in pots only two-thirds filled with soil, in order to allow of a liberal top-dressing at the time when it is most required. Plants such as Deutzias, Genistas, Palms, Cacti, and succulents generally may be grown in the same pots for several years, assisted by the addition of annual top-dressings of enriched compost. With subjects in small pots, good loam, in which a proportion of artificial manure is mixed, is the top-dressing generally employed, but with large specimens, or those whose growth is only of annual duration, well-decayed animal manures are used.

Photo: Cassell & Company, Ltd.

TORENIA FOURNIERI (*see p. 398*).

In top-dressing an established plant the ball of soil and roots may be held inverted in the left hand while the drainage is rearranged where necessary, then returned to its normal position, and as much of the old soil as can be removed without damage to the roots gently worked off around the top of the ball with the thumb and fingers. The plant is then restored to its pot, the rich new compost added, and rammed down to make it of a similar consistency to the old ball. Many practitioners cut off the lower roots of plants such as forcing Lilacs, Guelder Roses, Deutzias, and Spiræas with an axe, in order to be able to give a more liberal top-dressing.

TOPIARY WORK.

The practice of cutting and trimming various trees and shrubs into definite shapes, some of which were very fantastic, reached its zenith of popularity in the sixteenth century, but it held sway for many years after. It fell into disrepute in the nineteenth century, owing to the persistence with which the more natural styles of gardening came to the front, but even now this phase of "gardening" exercises a considerable fascination upon a large section of the public; witness the interest excited of late years by the exhibits of trimmed trees which have appeared at the London shows. Some gardens, notably at Elvaston Castle, Derby, have still extensive examples of the topiary art. Less pretentious are the trimmed Yews to be found in many an old-fashioned garden, and although these trees do not, as a rule, display the fantastic shapes which the old-time topiarist delighted in, they are still sufficiently *bizarre*. The favourite subject was, and is, the Yew, which seems to take kindly to any training. The Holly in a number of varieties, and the Box, are others. A vast amount of trouble, and some skill, are needed in inducing the trees to take on these unnatural shapes. Regular clippings must be given, and a close watch maintained upon the growth of very strong branches. Timely pinching is relied upon to check the over-luxuriance of any branches that may threaten to endanger the symmetry of the tree. Once the required form has been obtained the treatment does not differ from that meted out to a closely clipped Box or Holly hedge.

The practice of pruning various specimen lawn trees more or less vigorously, until the heads assume a spherical or pyramidal outline, is an approach to the topiarist's ideas. Yet the practice finds favour in many quarters to-day, although it only differs in degree, and not in principle, from the best example of the topiary art of the sixteenth century. It should not be confused with the close pruning given to street trees.

TORENIA.

Stove herbs (*ord.* Scrophularineæ) of great beauty, especially those suitable for growing in hanging baskets, such as flava, asiatica, concolor, and Fournieri, the first-named being the most suitable for this purpose, as it is pendulous. Propagation, by seeds and by cuttings, in sand under a bell-glass. Soil, equal parts fibrous loam and peat, with sand. A little dried cow manure may be added at the final shift.

Principal Species and Varieties :—

asiatica, 1′ to 1½′, Je., pur.
concolor, 1′ to 1½′, Jy., pur. (*syn.* rubens of gardens).
flava, 8″ to 2′, sum., gold, throat yel. and blk. (*syn.* Bailloni).
Fournieri, 8″ to 12″, sum., pale bl., blk., pur., yel. (*see p.* 397).
— compacta, dwarfer and more compact.

Other Species and Varieties :—

asiatica hirsuta, Je., wh. (*syn.* hirsuta).
cordifolia, 6″ to 8″, sum., lil.
Fordii, pale straw, pur. blotches.
pedunculatis, 6″ to 10″, yel., pur. (*syn.* edentula).
— exappendiculata, wh., deep bl.
rubens (of gardens, *see* concolor).

TORREYA (*syns.* CARYOTAXUS and FŒTATAXUS).

Hardy evergreen trees (*ord.* Coniferæ), characterised by the very strong and unpleasant odour which the leaves and branches exhale when bruised. Propagation is by seeds, sown in spring. The fruits are gathered when ripe, and stratified in sand like those of the Hawthorn. Cuttings may be easily rooted in sandy soil under a hand-light in August, and layering is not infrequently practised. Almost any soil will do.

Principal Species :—

[NOTE.—The synonymy is that of the *Kew Hand-List*.]

californica, 20′ to 40′, lvs. pale yel., grn., fruits nearly round (*syn.* Myristica). Californian Nutmeg.
grandis, 60′ to 80′, lvs. light grn. above, lined greyish wh. beneath, fruits grn. (*syn.* Cephalotaxus umbraculifera).
nucifera, 20′ to 30′, lvs. leathery, sharp pointed, fruits oval.
taxifolia, 40′ to 50′, lvs. sharp pointed, grey beneath, lined red, branches horizontal, fruits as large as a Walnut, oval. Stinking Cedar.

TORRUBIA.

This genus of Fungi, which belongs to the group Pyrenomycetes, is remarkable for its mass of clubbed, fleshy mycelium (stroma), which bears the flask shaped perithecia and their enclosed asci. The members are parasitic upon insects and spiders, and a few attack other Fungi. The name Torrubia is the common one, but Cordyceps, given by Elias Fries, a Swedish mycologist, takes precedence. Formerly a stage of the Fungus in which no asci were discoverable was referred to Hymenomycetes under the name of Isaria, and this name is still kept up to some extent because of the uncertainty that exists as to the true affinities of some species. It is by no means certain that all the forms referred to Isaria belong of right to Cordyceps (Torrubia). Entomorrhiza and militaris are parasitic upon a number of insects or their larvæ or pupæ in this country, and must therefore be classed as friends of the gardener. No species of Cordyceps has, so far, been found to be injurious. The Vegetable Caterpillar of New Zealand, which is usually found growing out of the body of the Ghost Swift or Otter Moth, is the Huegelii of Corda and the Robertsii of Berkeley. The former name has the priority.

TORTRIX.

The typical genus of the group Tortricina (*ord.* Lepidoptera), popularly known as Tortrices or Bell Moths. The old genus Tortrix has been broken up into several genera, so that the greater number of the more destructive species now appear under different headings. The most destructive species is viridana, which often defoliates Oak and Hornbeam trees. Ribeana feeds on many trees and shrubs. Corylana feeds on the Hazel and Dogwood. The Rose Tortrix is now Lozotænia rosana; Tortrix or Pœdisca angustiorana (the Grape Moth) is properly Ditula angustiorana; Tortrix nigricana (Red Grub of Plum) is Carpocapsa funebrana; Tortrix wœberana (the Plum Tree Tortrix) is Semasia wœberana; Tortrix pomonana (the Codlin Moth) is Carpocapsa pomonella; and the several species of Pine Tree Moths or Tortrices are now classed under Retinia. For remedies *see* the various plants named.

TOURNEFORTIA.

Stove and greenhouse shrubs (*ord.* Borragineæ), similar to Heliotropium. Propagation, by cuttings in a close case. Soil, fibrous loam and one-fourth of leaf soil, with plenty of sand. Several species may be bedded out in summer in the same way as Heliotropes.

Principal Species :—

cordifolia, sum., grh. or hlf-hdy., wh., lvs. 9″ to 16″ long.
heliotropioides, 2″, My., lil. (now Heliotropium anchusæfolium).
lævigata, 1½′ to 2′, Jy., lil.
scandens, 10′, Jy., greenish yel.

Other Species :—

fruticosa, 4′, Je., yel.
laurifolia, 12′, Jy., yel.

TOURRETIA (*syn.* DOMBEYA of L'HERITIER).

A hardy, climbing herb (*ord.* Bignoniaceæ) allied to Eccremocarpus. Propagation, by seeds in March in a stove temperature, transplanting the seedlings at an early stage. Plant in a sheltered spot against a wall in June, after hardening off. Any light garden soil.

Only Species :—

lappacea (*see* volubilis).
scaber (*see* Eccremocarpus scaber).
volubilis, 6′, Jy., vio. pur.

TOVOMITA (*syns.* BEAUHARNOISIA, MARIALVA, and MICRANTHERA).

Stove trees and shrubs (*ord.* Guttiferæ), valued chiefly for their leathery, feather-nerved leaves.

Torch Lily (*see Kniphofia*).
Torch Thistle (*see Cereus*).
Toringo Crab (*Pyrus Toringo*).
Tormentil (*see Potentilla*).
Tortoise Plant (*see Testudinaria*).
Tortoiseshell Butterfly (*see Vanessa*
Totara Pine (*Podocarpus Totara*).
Touch-me-not (*see Impatiens*).
Tovaria (*see Smilacina*).

Propagation, by cuttings in a close case. Soil, fibrous loam, one-third peat, and plenty of sand.

Principal Species :—

amazonica, 6′ to 10′, st. choisyana, 10′, My., yel. (*syn.* Micranthera clusiæfolia).

TOWNSENDIA.

A small genus of annual or perennial herbs (*ord.* Compositæ) allied to Aster, and requiring similar treatment. The rays vary from rose to white. They are of little horticultural value. Wrightii is now referred to Aster Wrightii.

TOXICODENDRON of THUNBERG (*syn.* HYÆNACHNE).

Two species of large, greenhouse shrubs (*ord.* Euphorbiaceæ). Propagation, by cuttings in sand in a dry stove heat. Soil, light sandy loam, broken bricks or crocks, and sand. They are suitable for associating with succulents. Capense (*syn.* Hyænachne globosa), 6′, June, green, is the only introduction. For Toxicodendron of Linnæus, *see* Rhus Toxicodendron, the Poison Ivy. Toxicodendron of Gærtner is Allophylus.

TRACHEA.

This is a small genus of Moths belonging to the Noctuæ, of which piniperda, the Pine Beauty Moth, is British. These moths, which are red or reddish brown with grey and orange markings and white spots on the middle of the wings, are to be seen in early spring. The larvæ are yellowish green, lined with white above and orange beneath. They feed upon the leaves of Firs in summer, and usually spin their cocoons and pupate in crevices of the bark, occasionally in the soil. Although the moths are not often sufficiently numerous to do much harm, a bad attack may be reduced by shaking the caterpillars from small trees. Grease banding large trees is helpful.

The name Tracheæ is also given to the breathing tubes of insects (*see* INSECTS) and to certain thickened vessels of the wood of trees which resemble these tracheæ in build.

TRACHELIUM.

Dwarf, greenhouse, perennial herbs (*ord.* Campanulaceæ). Propagation, by seeds sown in heat in spring, or by cuttings. Soil, fibrous loam, with a fourth part of leaf mould, and sand. Plants raised from cuttings in spring may be grown in frames during summer, and pinched once or twice to make them bushy. At the last shift a little dried and powdered cow dung may be mixed with the compost. For greenhouse and conservatory decoration cæruleum is invaluable, and very popular on account of the light and graceful character of the flowers.

Principal Species :—

cæruleum, 1′ to 3′, sum. to win., pale bl. — album, wh.

TRACHELOSPERMUM (*syns.* PARECHITES, RHYNCHOSPERMUM, and TRIADENIA).

Greenhouse and hardy evergreen climbers (*ord.* Apocynaceæ). Propagation, by cuttings in sand, under a bell-glass. Soil, equal parts peat and loam, with sand.

Town Cress (*see Lepidium sativum*).
Toxicophlæa (*see Acokanthera*).

Principal Species and Varieties :—

jasminoides, 6′ to 10′, sum., wh., fragrant (*syns.* Parechites Thunbergii and Rhyncospermum jasminoides).
— angustifolium, lvs. narrower, hdy. on a wall (*syn.* Trachelospermum angustifolium).
— variegatum and varium are other vars.

TRACHYCARPUS.

Two species of fan Palms (*ord.* Palmæ), one of which, excelsa, is hardy in the more favoured parts of Britain and Ireland if planted in sheltered situations to prevent the leaves being damaged by wind. Most often they are grown in a greenhouse, occasionally in a stove. The heads of yellowish white flowers are striking. Propagation, by imported seeds in heat and by offsets (*see* PALMS). Soil, fibrous loam, with a third of peat and some sand. If large specimens in tubs are desired some leaf mould and dried cow dung may be added.

Only Species :—

excelsa, 6′ to 60′, sum., hdy. or grh., yellowish wh. (*syns.* Fortunei and Chamærops Fortunei).
martiana, 9′, grh., yel. (*syns.* Griffithii and khasyana, and Chamærops Griffithii and martiana).

TRACHYLOBIUM.

Stove evergreen trees (*ord.* Leguminosæ). Propagation, by cuttings of young shoots under a bell-glass. Soil, a good, mellow loam and peat.

Only Species :—

hornemannianum. Copal.
verrucosum, 20′, wh.

TRACHYMENE.

Annual or perennial greenhouse plants (*ord* Umbelliferæ). Propagation, by seeds in heat, the perennials by cuttings in sand. Soil, loam, sand, and peat.

Principal Species :—

cærulea, 1½′, Jy., hlf-hdy. ann., bl. (*syn.* Didiscus cæruleus).
compressa, 1′, per., yel. (correctly Siebera compressa).
lanceolata, 3′, sum., per., wh. (Sprengel, not Rudge; correctly Siebera Billardieri lanceolata).
linearis, 2′, Jy., per., yel. (correctly Siebera linearifolia).
ovalis, 1′, My., per., wh. (correctly Siebera Billardieri).

TRACHYSTEMON.

Hardy perennials (*ord.* Boragineæ). Propagation, by seeds or division in spring. Any common soil

Only Species :—

creticus, 1′, My., bl. (*syn.* Borago cretica).
orientalis, 2′, Mch., purplish bl. (*syn.* Borago orientalis).

TRADESCANTIA. (SPIDERWORT.)

Ornamental, stove, greenhouse, or hardy herbs (*ord.* Commelinaceæ), of considerable value. The popular pendula is properly Zebrina pendula. Propagation, the stove and greenhouse species by cuttings in light soil, the hardy ones by division or by seeds in spring. Common soil.

Principal Species and Varieties :—

congesta, 2′, Jy., hdy., light bl.
crassifolia, 2′, Aug., hlf-hdy., purplish ro. or bl.
— acaulis, differs little (*syn* iridescens).
elongata, procumbent, 2′, sum., st., pk., lvs. grn., banded wh.
fuscata, 8″, Sep., st., bluish pur.
iridescens (*see* crassifolia var.).
navicularis, trailer, sum., st., pk.

virginiana, 6″ to 2′, Ap., hdy. (*syn.* virginica); many vars., bl., vio., red, ro., wh., pilosa, etc., single and double.

Other Species:—

Crassula, 1½′, Jy., st., wh.
decora, lvs. grey and olive grn.
latifolia of Ruiz and Pav. is Tinantia fugax.
martensiana (now Callisia martensiana).
multiflora, procumbent, Je., st., wh. (*syn.* procumbens).
pilosa (*see* virginiana).
pulchella, procumbent, Jy., grh., ro. or bl.
Reginæ, lvs. whitish grn., veined dark grn.
superba, lvs. striped wh.
velutina, 1½′, My., st., pur. ro.

TRAGOPOGON. (Goat's Beard.)

Many species of hardy biennial or perennial herbs (*ord.* Compositæ) of easy growth. The dry seed heads of pratensis look pretty in winter mixed with Grasses. Propagation, by seeds sown in spring or summer. Common soil.

Principal Species:—

crocifolius, 1′, Je., bien., pur. or vio. (*syns.* glaber and Geropogon glaber).
glaber (*see* crocifolius).
major, 5′, My., per., yel. (*syn.* dubius).
porrifolius, 3′, My., bien., ro. or pur. Salsify, Common Spiderwort, Flower-of-a-Day.
warszewicziana, 6″ to 15″, My., st., pur., lil.
Zebrina (now Zebrina pendula).
Vegetable Oyster (*see* Salsify).
pratensis, 1′ to 2′, Je., bien., yel. Goat's Beard, Noon Flower, Star of Jerusalem, Shepherd's Clock, etc.
ruber, 1½′, My., per., ro. (*syn.* roseus).

TRAMETES.

A small genus of Fungi (*ord.* Polyporei) closely allied in build to the Polyporuses. The typical British species is Pini, but it is by no means restricted to this country, for it has been known to do great damage to Pines and Larches upon the Continent; it produces what is popularly known as Red Rot. The reproductive organs grow out from the trunks of the affected trees as relatively large, rusty brown masses, the wood being destroyed by the mycelium within. The radiciperda of Hartig, which is such an inveterate enemy of Conifers, is correctly Polyporus annosus (which *see*). The other species of Trametes are not harmful to any special degree. (For remedies, *see* Polyporus.)

TRANSPLANTING.

Most young seedlings are benefited by being transplanted from the seed bed to nursery beds before being consigned to their permanent quarters. This is even true in the case of such subjects as young plants of the Brassica tribe, which are usually not given this intermediate stage, for it makes them sturdier, and, moreover, affords an excellent opportunity for getting rid of the first signs of that inveterate pest the gall weevil. The transplanting of many tender seedlings has already been dealt with under Pricking off.

The transplanting of large deciduous trees and shrubs may be taken in hand at any time from the cessation of active growth until its resumption, *i.e.* from the beginning of October until nearly the end of March. Evergreens move well in April, and Hollies in May; Rhododendrons at the end of March and the beginning of April. If the young tree or shrub is of fair size it may be advisable to prepare it for transplanting by digging a trench about it and root pruning it a year previously. With the greater quantity of fibrous root that the root pruning induces it to form, it transplants with much less risk to itself than would otherwise be the case. Young trees and shrubs should never be allowed to grow for more than three years in one spot, unless it is their permanent abode. Two years is an even safer limit, and such things as young Hollies, which are inclined to have very straggling root systems with a deficiency of fibres, may be shifted every year with advantage. The age at which a tree or shrub may be successfully lifted and planted in another place depends in great measure upon the mechanical difficulties to be encountered in moving the dead weight of its stem, branches, roots, and the soil they are moving in. Naturally young trees possess greater recuperative powers than old ones, but still the secret of success lies in moving the tree with a large ball of soil and practically all the roots intact. Special transplanting machines, of which Barron's and McNab's are familiar instances, are in use. The tree to be lifted is slung between wheels, carried to its destination in either an upright or a sloping position, the machine is placed over the hole, and the tree is lowered gently into its new quarters. In moving both large and small specimens it is sometimes necessary to bind the ball round with mats, particularly if the soil is inclined to be light and sandy.

Tragium Anisum (*Pimpinella Anisum*).

TRAPA. (Water Caltrops.)

Singular, floating herbs (*ord.* Onagrarieæ), which may be grown in tubs or tanks. Propagation, by seeds. They should have a few inches of loamy soil at the bottom of the vessel in which they are grown. Natans is not hardy in all localities.

Principal Species:—

bispinosa, Jy., st., bien., wh.
natans, Jy., generally hdy., ann., wh. (*syn.* bicornis). Water Caltrops, Water Chestnut, Jesuit's Nut, etc.
verbanensis, Jy., generally hdy., wh.

TRAPS.

Seeing that so many pests make free with the garden and its produce, it is manifest that the gardener must have some knowledge of suitable traps for catching the depredators. Numbers of these have been mentioned under the names of the various pests referred to.

Rats may be caught by the favourite spring snare or gin, but the operator should wear gloves in setting it, for the animals have a very acute sense of smell. A large break-back wire trap upon the same principle as that used for mice, but larger, is useful. So is the wire cage which catches the animal alive and uninjured. The gin and the wire may be employed for rabbits when they break into the flower garden. Mice may be caught in the box wire and wood trap or the break-back, while the best of the home-made traps is the figure 4. For moles the steel spring trap may be used; the old wooden spring and string combination is rarely used now. For flies and wasps jars of sweetened liquor may be provided. Slugs will fall a prey to tender leaves of Cabbage and Lettuce. Beetles and Cockroaches may be caught in the patent revolving box traps sold; these are baited with sugar. A little phosphorus paste is better still when the pests are numerous. Earwigs on Chrysanthemums and Dahlias may be caught in pieces of dry Bean stalks, or in small pots half filled with dry hay. For flies the time-honoured fly

paper is available. The only good trap for birds is to throw down a few handfuls of corn and remain on the watch with a gun.

TRAUTVETTERIA. (False Bugbane.)

A hardy perennial herb (*ord.* Ranunculaceæ), useful for the borders. It resembles the Cimicifugas and Actæas. Propagation, by division in spring or early autumn. Common, moist soil.

Only Species :—

palmata, 2′ to 3′, sum., wh. (*syns.* Cimicifuga palmata and Actæa palmata).

TRECULIA. (African Bread Fruit Tree.)

Two species of stove trees or shrubs (*ord.* Urticaceæ). The introduced species, africana, is propagated by cuttings of ripe shoots in bottom heat. Soil, rich loam and leaf mould.

Principal Species :—

africana, 80′, Sep., st. ev., grn. Okwa.

TREE ONION.

This, Allium proliferum (*ord.* Liliaceæ), produces no basal bulbs, but a number of offsets at the root, and also bulbs mixed with the flowers. The plants may be allowed to remain in the ground for two or three years, when they must be lifted and divided. Planting may be performed in autumn or spring, according to the time the crop is required, June or August. The offsets are more reliable for producing the bulbs, and the stem bulbs are best planted in spring. They should not be gathered until the stems are yellow. If properly dried they will keep till May. (For culture, *see* Shallots.)

TREES.

Technically speaking, a tree is described as a "perennial plant of woody character which rises from the ground with a distinct trunk," but the border line between a tree and a shrub is so indefinite that popular opinion calls a woody plant of greater stature than a few feet a tree instead of a shrub.

The value of trees as timber producers is, of course, inestimable, and tree planting on a large scale is a national duty. From a gardening aspect there can be no question that the judicious planting of trees constitutes much of the beauty and variety of the pleasure grounds. Their shelter is of great assistance in the garden, while their shade adds much to the pleasure of the summer-time. In small gardens large trees are often placed in unsuitable positions, either too near houses or where they will overshadow the garden or rob the soil. The eventual height and width to which the tree will attain ought to be observed, and allowance made at the time of planting. Its effect at all seasons should also be studied, and it is thus often advisable to plant deciduous rather than evergreen trees where plenty of light in winter is desired. On the other hand, an evergreen tree is to be preferred where a screen at all seasons is required. There should also be a due proportion of flowering trees, many of which are exceedingly beautiful, particularly those with golden, silvery, or variegated foliage, and others which give fine tints in autumn. Fruit trees are very ornamental, either in bloom or in fruit, whilst they serve to combine the useful and decorative.

Planting should be most carefully performed. Autumn is, as a rule, the best time for deciduous subjects. For evergreens, September or October and April or May are usually suitable times, provided the weather be moist. The holes in which the trees are to be planted ought always to be of ample size, as it will greatly cripple their progress if their roots are jammed into too little space. The hole should be so wide that the roots may be laid out at full length, any injured ones being cleanly cut before the soil is filled in. The tree ought to be held upright, staked firmly, and the soil filled in and made firm as the work proceeds. Watering may be necessary if the weather is at all dry and the season advanced. (*See also* Transplanting, Pruning, Shrubberies, and Shrubs.)

The following lists of hardy trees for various objects will be found useful. Only the genera are named, and the best species or varieties will be found elsewhere under their respective names.

Coniferous Trees :—

Abies.	Juniperus.	Pseudotsuga, or Abietia.
Araucaria.	Larix.	Sciadopitys.
Cedrus.	Libocedrus.	Sequoia.
Cephalotaxus.	Picea.	Taxodium.
Cryptomeria.	Pinus.	Taxus.
Cunninghamia.	Podocarpus.	Thuya.
Cupressus.	Prumnopitys.	Tsuga.
Fitzroya.	Pseudolarix, or Laricopsis.	
Ginkgo.		

Deciduous Trees :—

Acer.	Fagus.	Paulownia.
Æsculus.	Fraxinus.	Platanus.
Ailantus.	Gleditschia.	Populus.
Alnus.	Halesia.	Prunus.
Amelanchier.	Hippophae.	Pterocarya.
Betula.	Juglans.	Pyrus.
Carpinus.	Kœlreuteria.	Quercus.
Carya.	Laburnum.	Rhus.
Castanea.	Liquidambar.	Robinia.
Catalpa.	Liriodendron.	Salix.
Celtis.	Magnolia (in part).	Sambucus.
Cercis.	Morus.	Sophora.
Corylus.	Nyssa.	Styrax.
Crataegus.	Oxydendron.	Syringa.
Euonymus (europæus).	Parrottia.	Tilia.
		Ulmus.

Evergreen Trees (see also Coniferous Trees) :—

Arbutus.	Elæagnus.	Laurus.
Cerasus (some).	Eucalyptus.	Quercus.
Crataegus (some).	Ilex.	

Trees for Lake or River Sides :—

Acer.	Cupressus (some).	Quercus.
Alnus.	Halesia.	Salix.
Arbutus.	Juniperus.	Syringa.
Betula.	Picea.	Taxodium.
Catalpa.	Pinus.	Taxus.
Celtis.	Populus.	Thuya.
Crataegus.	Prunus.	Tsuga.
Cryptomeria.	Pterocarya.	Ulmus.

Traveller's Joy (*see Clematis Vitalba*).
Traveller's Tree (*see Ravenala madagascariensis*).
Treasure Flower (*see Gazania*).
Tree Carrot (*Thapsia edulis*).
Tree Celandine (*Bocconia frutescens*).
Tree Mallow (*see Lavatera arborea*).
Tree of Heaven (*see Ailantus glandulosa*).
Tree of Life (*see Thuya*).
Tree of Sadness (*Nyctanthes Arbor-tristis*).

Trees for the Seaside :—

[NOTE.—Some will require shelter from strong winds, especially at first. Those marked * are good shelter plants; those needing least shelter marked †.]

Abies.
†Acer.
Ailantus.
*†Alnus.
Araucaria.
Arbutus.
*†Betula.
†Carpinus.
Cerasus.
†Corylus.
†Cratægus.
Cupressus (some).
†Elæagnus.
†Fagus.
†Fraxinus.
†Ilex.
†Juniperus.
†Laburnum.
Picea.
Pinus.
†Platanus.
Populus.
Prunus.
†Pyrus.
†Quercus.
*Salix.
†Sambucus.
Syringa.
Taxus.
Thuya.
†Ulmus.

Trees for Towns :—

Acer.
Æsculus.
Ailantus.
Alnus.
Amelanchier.
Arbutus.
Betula.
Cercis.
Cratægus.
Fagus.
Fraxinus.
Ginkgo.
Gleditschia.
Ilex.
Juglans.
Juniperus.
Kœlreuteria.
Laburnum.
Liriodendron.
Magnolia.
Morus.
Paulownia.
Platanus.
Populus.
Prunus.
Pyrus.
Quercus.
Robinia.
Salix.
Sambucus.
Syringa.
Taxus.
Thuya.
Tilia.
Ulmus.

Weeping Trees :—

Acer.
Alnus.
Betula.
Cedrus.
Cupressus.
Fagus.
Fraxinus.
Ilex.
Juniperus.
Laburnum.
Larix.
Picea.
Populus.
Prunus.
Salix.
Sophora.
Taxus.
Thuya.
Ulmus.

TRELLIS.

The name given to framework of various kinds and materials on which plants are trained, such as on the roofs and walls of glasshouses, in pots to support plants, on walls for the same purpose, or to screen unsightly objects or form a shelter in the garden. Plain trellises may be used, but the diamond pattern looks best. Balloon shaped or pyramidal trellises are in common use for pots. For a permanency galvanised wire (which ought also to be painted) is good, but many prefer wooden trellis for the ornamental garden or for a shelter. Both wire and wooden trellises can be purchased at a cheap rate, and with various sizes of openings or "mesh." The only advantage of having wooden trellis made to order is that the timber can be painted one or two coats before being fastened together, which preserves it better where the timbers cross. Half-round wooden spars are stronger than the flat.

TREMANDRA.

Greenhouse shrubs (*ord.* Tremandreæ). Propagation, by cuttings of young side shoots in sand under a glass. Soil, turfy loam, peat, and sand, with some charcoal and pieces of brick or broken pots.

Trefoil (*see Trifolium*).
Trefoil, Bird's Foot (*see Lotus corniculatus*).
Trefoil, Golden (*see Anemone Hepatica*).
Trefoil, Milk (*see Cytisus*).
Trefoil, Moon (*Medicago arborea*).
Trefoil, Scented (*see Melilotus*).
Trefoil, Shrubby (*Jasminum fruticans and Ptelea trifoliata*).

Principal Species :—

Huegelii of gardens (now Tetratheca hirsuta).
stelligera, 2′, sum., purplish (*syn.* oppositifolia).
verticillata (now Platytheca galioides).

TREMBLING TREES.

Several trees which move their leaves at the slightest breath of wind are popularly known as Trembling Trees. The best known of these are Populus tremula and P. tremuloides, the former being the well-known Aspen.

TRENCHING.

An important and valuable operation, but one often neglected because of the labour involved. Where the subsoil is inert or of bad quality it is an error to adopt trenching at first, and bastard trenching (which *see*) ought to be performed in the first place until the lower spit of soil is ameliorated. At the beginning make a trench two spits or three spits deep and 20″ or so wide, wheeling the soil thus removed to the farther end of the ground to be trenched. After this, measure out another trench with the line, and fill the bottom of the first trench with the soil from the top of the second one, that from the bottom of the second going on the top, leaving it rather rough during winter. Manure and surface rooting weeds may be buried at the bottom of the trench. Autumn is the most suitable season.

TREVESIA.

Handsome foliage stove shrubs or trees (*ord.* Araliaceæ). The flowers are of little consequence. Propagation, by cuttings in heat. Soil, loam, leaf soil, and sand.

Principal Species :—

eminens, lvs. palmatifidly divided and serrated.
palmata, 10′, Mch., grn., lvs. palmate or digitate (*syn.* insignis).
sundaica, resembles palmata.

TREVOA.

Greenhouse trees (*ord.* Rhamneæ). The only species introduced, trinervia, is lost to cultivation.

TREVORIA.

A recently introduced genus of Orchids (*ord.* Orchidaceæ), named in honour of Sir Trevor Lawrence, Bart. Chloris, the only known species, is not yet sufficiently in commerce to test its full cultural requirements. It has racemes of yellowish flowers.

TREWIA.

Three or four species of stove trees (*ord.* Euphorbiaceæ). Propagation, by cuttings in sand under a glass. Soil, loam and peat, with sand.

Principal Species :—

nudiflora, 3′ to 8′, My., st.. grn.

TRIANEA.

The correct name of the floating aquatic plant known in gardens as Trianea bogotensis is Limnobium bogotense. Propagation, by runners. It requires stove or greenhouse treatment.

TRIAS.

Stove Orchids (*ord.* Orchidaceæ) of creeping or tufted habit, with one flower on a leafless scape. Grow on blocks or in pans with sphagnum and peat.

Trevirana (*of Willdenow, see Achimenes*).

Principal Species :

oblonga, 3″, Apr., grn., br., lip pur.
picta, pale yel., spotted red, pur.
vitrina, pale grn., spotted br. on lip.

TRIBULUS. (Caltrops.)

Rather weedy-looking, greenhouse, stove, or hardy annual or perennial herbs (*ord.* Zygophylleæ). The projecting points of the seed vessels, which pierce things with which they come into contact, are interesting. All have white or yellow flowers. Cistoides, stove evergreen, and maximus and terrestris, both hardy, have been introduced.

TRICHANTHA.

Two species of climbing or creeping stove shrubs (*ord.* Gesneraceæ). Propagation, by cuttings. Soil, peat, leaf soil, and sand.

Principal Species :—

minor, st. cl. shr., dull vio., tube marked yel.

Principal Species :—

exaltatum, 3′, Je., yel., tipped red (*syn.* alopecuroideum of *Botanical Register* 28).
Manglesii, 6″ to 12″, Je., pk. or wh (*see* figure).
Stirlingii, Je., pk., wh.

TRICHOCAULON.

Two species of succulent greenhouse plants (*ord* Asclepiadeæ). Propagation, by cuttings, slightly dried at the base. Soil, sandy loam with brick rubbish.

Principal Species :—

piliferum, 4″, dark pur. inside, pale yel., red on exterior (*syns.* Piaranthus piliferus and Stapelia pilifera).

TRICHOCENTRUM.

About twenty species of intermediate house epiphytal Orchids (*ord.* Orchidaceæ), growing on blocks.

Trichinium Manglesii.

TRICHILIA.

Little cultivated stove trees or shrubs (*ord.* Meliaceæ). The flowers are seldom produced in Great Britain. Propagation, by cuttings of ripe shoots, in sand, in heat. Soil, mellow, fibrous loam and sandy peat.

Principal Species :—

glabra, 30′, Je., wh. (*syn.* havannensis).
hirta, 12′, Je., wh. Bastard Ironwood.
odorata, 20′, Je., yel.
spondioides, 20′, Je., grn., yel. White Butterwood.

TRICHINIUM.

Perennial greenhouse herbs, sub-shrubs, or shrubs (*ord.* Amarantaceæ), with close spikes of shaggy-looking flowers. Propagation, by seeds sown in a hotbed in April, or by root cuttings, 1″ long, in sand in bottom heat. Soil, rich loam and peat. They should be near the light, or in full sun, in a cool greenhouse. Rest after flowering.

Tribrachium (*see Bulbophyllum*).

Principal Species :—

albo-purpureum, br., wh., pur.
— striatum, lip striped pur.
orthoplectron, br., yel., wh., lake.
Pfavii, br., wh., red.
tigrinum, yel., br., wh

TRICHOCEROS.

Stove Orchids (*ord.* Orchidaceæ) growing in peat and sphagnum in baskets or pans.

Principal Species :—

parviflorus, grn., spotted and barred pur., br.

TRICHOCLADUS (*syn.* Dahlia of Thunberg).

Greenhouse evergreen shrubs (*ord.* Hamamelideæ). They are treated like Gardenias, which *see*.

Principal Species :—

grandiflorus, Jy., shr., wh., pk.

Trichocarpa (*see Deparia*).

TRICHODESMA.

Coarse growing, hardy, half-hardy, or greenhouse herbs (*ord.* Borragineæ), with flowers in racemes, and entire leaves. Propagation, by division or seeds. Common soil.

Principal Species :—

physaloides, 1′ to 2′, grh. per., wh., pur.
zeylanicum, 4′, Aug., hdy. ann., pale bl. (*syn.* Borago zeylanica).

TRICHOGLOTTIS.

Stove Orchids (*ord.* Orchidaceæ) with small flowers. They do well in pans of sphagnum with the temperature of the East India house.

Principal Species :—

cochlearis, 8″, wh., sepals and petals barred pur., lip with pur. blotches.
dawsoniana, sulphur yel. outside, darker inside, barred br., lip or. yel., blotched br. (*syn.* Cleisostoma dawsoniana).
fasciata, sepals banded pale br., lip wh., yel., pur. (correctly Stauropsis fasciata).

TRICHOMANES (Bristle Fern).

Stove or greenhouse Ferns (*ord.* Filices). Many of the species are exceedingly beautiful, some of the dwarf ones ranking among the daintiest of Ferns. The general aspect of the genus is very varied. Some plants make quite large fronds 1′ to 1½′ long, and correspondingly wide, whilst the fronds of others are scarcely 1″ in length. In shape also a great variation is found, some being simple, others pinnate, and others again divided into innumerable segments. In some cases short stems are made, which bear large heads of fronds, whilst in others the stems are creeping and very small, the leaves being borne singly. As a whole the leaves are very thin, and covered with star shaped or forked hairs, from which tiny drops of moisture are suspended. The popular Killarney Fern, T. radicans, is found wild in Ireland. In almost all cases they are found in warm, moist situations in dense shade on the lower portions of trunks of trees, damp rocks, etc. Under cultivation they must always have a moist atmosphere, abundance of water when growing, and perfect drainage. The most suitable compost is fibrous peat, intermixed with soft sandstone. The compost should be mounded up over the top of the pot or pan, so that plenty of space may be free for drainage. The dwarf rhizomatous species may be planted on pieces of soft Tree Fern stem or sandstone, which is, indeed, the best method to adopt. As Wardian case subjects Trichomanes are charming, whilst a few species can be cultivated in a close, cold frame.

The following genera are now merged in Trichomanes. Feea, Hymenostachys, Involucraria, Lacostea, Lecanium, Microgonium, and Phlebiophyllum.

Principal Species and Varieties :—

[Note.—The figures apply to the length of the fronds.]

alatum, 3″ to 12″, winged.
— attenuatum, fronds longer.
apiifolium, 9″ to 18″.
auriculatum, 6″ to 12″.
Bancroftii, 3″ to 6″.
crispum, 4″ to 12″.
exsectum, 6″ to 12″.
Filicula, 2″ to 3″, creeping.
Kaulfussii, 4″ to 12″, winged.
Kraussii, 1″ to 3″, creeping.
membranaceum, 2″ to 3″.
pinnatum, 3″ to 12″.
pyxidiferum, 1″ to 6″.
radicans, 4″ to 12″. Killarney Fern.
— Andrewsii, fronds narrower.
— crispum, margins crisped. [grn.
— dilatatum, very dark
trichoideum, 4″ to 8″, very finely divided.

Other Species :—

angustatum (*see* tenerum).
bipunctatum (*see* Filicula).
Bojeri (*see* cuspidatum).
boschianum (*see* radicans).
cuspidatum, 2″ to 3″.
maximum, 3″ to 6″.
meifolium (*see* apiifolium).
reniforme, 4″, kidney shaped fronds.
scandens, 6″ to 8″, cl.
tenerum, 3″ to 8″.

TRICHOPETALUM.

The only species (*ord.* Liliaceæ) is a half-hardy herb with a fleshy rootstock and fibres. Propagation is by division, and a light, rich soil is needed. The plants do well in pots, or they may be planted out in a frame, provided the bed is well drained. They will not succeed otherwise.

Only Species :—

stellatum, 1′ to 3′, My., Je., hlf-hdy., grn. (*syns.* gracile and Anthericum plumosum; correctly Bottionea thysanthoides).

TRICHOPILIA.

Description.—Showy, epiphytal Orchids (*ord.* Orchidaceæ), which make dense masses of small pseudo-bulbs, each of which is terminated by a single leaf. From the bases of the pseudo-bulbs the flower spikes appear, assuming a pendulous habit as they approach maturity. The genus has been separately described under Leucochyle and Pilumna.

Propagation.—By division when growth commences in spring.

Soil.—The most suitable compost is made up of fibrous peat, living sphagnum, charcoal, and broken crocks. Orchid baskets should be used, the compost being formed into a mound above the top of the basket.

Other Cultural Points.—An intermediate or warm greenhouse temperature is necessary, and on no account should more heat be given. During the growing season a fair amount of water is necessary, reducing the supply when growth is finished.

Principal Species and Varieties :—

albida, 1′, sum., wh., yel.
coccinea marginata, 15″, My., Je., brownish red, sepals and petals bordered with greenish yel.
fragrans, 1′, win., wh., yel.
— nobilis, larger.
galeottiana, 1′, Aug., Sep., marked grn., br., crim., pur. (*syn.* picta).
grata, 1′, sum., wh., yel.
marginata (*see* coccinea).
suavis, 1′, Ap., wh., lip yel., spotted vio. ro.
— grandiflora, larger.
tortilis, 15″, Jan., yellowish wh., pur. blotches.

Other Species :—

backhousiana, 1′, sum., wh., yel.
coccinea crispa, 1′, Ap., My., crim. pur.
hymenantha, 1¼′, sum., wh., red.
kienastiana, 1′, Je., wh., yel.
lepida (*see* coccinea var.).
mutica, 1′, Aug., wh., tinged red.
rostrata, 6″, sum., wh., or.
sanguinolenta, 1′, sum., yel., crim., wh.

TRICHOPUS.

A stove genus (*ord.* Dioscoreaceæ), which has been known under the names Podianthus, Steireya, and Trichopodium of Lindley. Zeylanicus has been introduced; it is of no horticultural value. Piperifolius is correctly Bragantia tomentosa.

Trichonema (*see Romulea*).
Trichopodium (*of Lindley, see Trichopus*).
Trichopodium (*of Presl., see Dalea*).

TRICHOSACME.

Stove climbers (*ord.* Asclepiadeæ) with woolly stems and leaves and inconspicuous purple flowers. They may be grown in light fibrous loam and sand, but are of no horticultural value. Lanata, 6′, June, purple, is the principal species.

TRICHOSANTHES.

Annual or perennial climbing Gourds (*ord.* Cucurbitaceæ), the majority of which rejoice in a warm, humid atmosphere. They are distinguished by prettily fringed flowers, and usually long, twisted, snake-like fruits, which, when ripe, are bright red or scarlet in colour. Propagation, by seeds sown in spring. The most suitable soil is loam, enriched with well-rotted manure.

Principal Species :—

Anguina, 12′ to 20′, sum., wh., fruit red (*syn.* colubrina). Common Snake Gourd.
japonica, 10′, sum., wh., fruit ovoid.
palmata, 8′ to 10′, sum., wh., fruit small.

TRICHOSMA.

A monotypic genus (*ord.* Orchidaceæ). The only species, suavis (*syn.* Eria suavis), is a stove epiphyte with stems 10″ to 12″ high, bearing two leaves each, and terminal racemes of large, fragrant, creamy white blossoms, the lips of which are marked with crimson. It may be grown in shallow pans of fibrous peat and sphagnum.

TRICHOSTEMA.

Hardy perennial herbs (*ord.* Labiatæ), with whorls of small blue or purple flowers. Propagate by division, and plant in any ordinary garden soil.

Principal Species :—

arizonicum, 1′ to 2′, sum., bl.
lanata, 1½′, hlf-hdy. sub-shr., bluish pur.
ovatum, 1½′, Jy., bl.

TRICORYNE.

Dwarf, greenhouse perennials (*ord.* Liliaceæ), of tufted habit, with short, wiry stems, the leaves being narrow and Grass-like. Loam is the most suitable soil. The species are rarely seen. Elatior, 1′ to 2′, June, white, is the principal one.

TRICUSPIDARIA (*syn.* TRICUSPIS).

Dependens is one of two species in this genus (*ord.* Tiliaceæ) in cultivation, and that is rarely seen. It is a greenhouse, evergreen shrub, hardy, however, in many districts in sheltered places, growing 12′ high, bearing in April lovely bright red pendulous blossoms. It is often grown under the name of hexapetala. Propagation, by cuttings in sandy peat. Soil, fibrous peat.

TRICYRTIS.

Hardy or half-hardy perennial herbs (*ord.* Liliaceæ), with slender stems, hairy leaves, and curiously spotted flowers. Propagation, by division of the rhizomes in spring. Soil, sandy loam. A suitable position is a sheltered nook on the rockery.

Principal Species :—

flava, 2′, aut., hdy., yel., spotted pur.
hirta, 1′ to 3′, aut., hdy., wh., spotted pur. (*syn.* japonica).
macropoda, 2½′, aut., hdy., wh., pur. spots.

TRIDAX.

Hardy, perennial, herbaceous plants (*ord.* Compositæ), rarely cultivated, and of no horticultural value. Propagation, by division in spring. Ordinary garden soil.

Trichotosia (*see Eria*).
Tricratus admirabilis (*see Abronia umbellata*).

Principal Species :—

angustifolia, 1½′, Je., yel.
bicolor rosea, dwarf ann., rosy pk.
candidissima, 1′, Je., yellowish wh.
coronopifolia, 1′, Je., yel.
trilobata, 1′, Je., yel.

TRIENTALIS.

Pretty herbs (*ord.* Primulaceæ), of use for a shady place in the rock garden. Propagated by seeds sown under a hand-light in spring, or, in the case of americana, by division at the same time. Rich, loamy soil.

Principal Species :—

americana, 9″, My., wh.
europæa, 6″ to 8″, Je., Jy., wh.

TRIFOLIUM.

Annual or perennial herbs (*ord.* Leguminosæ), for the most part hardy, only a few species requiring protection. A great many are found wild in Britain, and those, together with the majority of the exotic species, are weeds. Though most of them possess no special qualifications as garden plants, they are of great importance to those engaged in agriculture, several species being valuable fodder plants. To most people the genus will be quite familiar, through the various Clovers and the Shamrock. All grow readily from seeds, and the perennials may be increased by division, though this is rarely practised.

Principal Species :—

alpestre, 6″ to 12″, Je., Jy., pur. Owl-headed Clover.
alpinum, 6″, Je., pk.
canescens, 6″, My., Je., crim.
hybridum, 6″ to 10″, Je., Aug., wh. or ro. Bastard Clover or Alsike.
incarnatum, 1′, Je., Jy., crim.
Lupinaster, 1′ to 1½′, Je. to Aug., pur.
medium, 6″ to 10″, My. to Sep., rosy pur.
pannonicum, 1′, Je., wh., yel.
pratense, 6″ to 12″, My., Sep., rosy pur. or wh.
procumbens, 1′, Je., yel.
repens, 3″ to 18″, Je., Aug., wh. Dutch Clover, Shamrock.
striatum, 4″ to 12″, Je., Jy., ro.

Other Species :—

armenium, 1′, Jy., red.
arvense, 3″ to 12″, Jy. to Sep., wh. or pk.
badium, 6″, Jy., yel.
filiforme, 4″ to 8″, Je., Jy., yel.
maritimum, 6″, Je., pur.
minus, 4″, yel. Shamrock of some.
parviflorum, 6″, Je., wh.
squarrosum, 6″, Je., pur.

TRIGLOCHIN.

Greenhouse or hardy sub-aquatic or marsh plants (*ord.* Naiadaceæ), with racemes of usually small flowers. They are not often cultivated. The two British species, maritimum and palustre, are met with in a wild state. Propagation, by seeds or division. Loamy soil, in water.

Principal Species :—

bulbosum, 1′, Oct., grh., pur.
maritimum, 12″ to 18″, My. to Sep., grn.
palustre, 6″ to 12″, Je. to Aug., grn.

TRIGONELLA.

Hardy herbs (*ord.* Leguminosæ), of annual or perennial habit. Propagation, by seeds or division. Ordinary garden soil.

Principal Species :—

cærulea, 1′ to 2′, Jy., bl. or wh.
Fœnum-græcum, 1′ to 2′, Je. to Aug., wh. Fenugreek.
ruthenica (now Medicago ruthenica).

Trifurcia (*see Herbertia*).
Triglossum (*see Arundinaria*).

TRIGONIA.

Evergreen climbing shrubs (*ord.* Vochysiaceæ). They require a stove temperature, are increased by cuttings, and grow in a mixture of equal parts of fibrous peat and loam, with sand.

Principal Species :—

candida, 6′, Je., wh.
lævis, 6′ to 8′, Je., wh.

TRIGONIDIUM.

Stove epiphytal Orchids (*ord.* Orchidaceæ). Cultivate on blocks of wood, or in baskets of fibrous peat, charcoal, and sphagnum, giving a light position near the glass.

Principal Species :—

acuminatum, 1′, sum., straw, br.
egertonianum, 1′, sum., br.
latifolium, 1′, sum., br.

TRILISIA.

Hardy, erect growing herbs (*ord.* Compositæ), increased by division in spring. Ordinary garden soil.

Only Species :—

odoratissima, 4′, Sep., pur., sweet.
paniculata, 3′, Aug., pur.

TRILLIUM.

A small genus of hardy perennial herbs (*ord.* Liliaceæ), the majority of which are in cultivation, and are interesting and often showy plants. The genus is distinguished by its thick, rhizomatous stems and roots, and three leaves, which have a solitary nodding flower in the centre. The roots of most of the species have emetic properties. Propagation, by seeds or division. Deep, rich, peaty soil, quite moist but sweet, forms the most suitable rooting medium. A rather shady place, and abundance of moisture when growth is active, are essentials to success.

Principal Species :—

cernuum, 1½′, Ap., wh.
erectum, 1′, Ap., pur. (*syns.* atropurpureum and purpureum).
grandiflorum, 1′ to 1½′, My., wh.
— roseum, ro.
sessile, 6″ to 12″, Mch., pur. Californicum is a good form.

Other Species :—

erythrocarpum, 6″, My., red, wh.
nivale, 1′, sum., wh.
ovatum, 6″, Ap., red.
petiolatum, 6″, Ap., br.
recurvatum, 6″ to 12″, Ap., brownish pur.
stylosum, 6″, Ap., red.

TRIMEZA.

Small bulbous plants (*ord.* Irideæ), with Iris-like, or sometimes Rush-like, leaves, and showy, fugitive flowers. Increased by seeds or division of the bulbs at the time of potting. Soil, light, fibrous loam, with sand. A stove or intermediate house is required.

Principal Species :—

martinicensis, 1′, Ap., yel.

TRINIA.

Hardy perennial herbs (*ord.* Umbelliferæ) of branching habit, with one species, vulgaris, British. The flowers are yellow or white and the leaves pinnately cut. The plants are of no value for decorative gardening.

TRIODIA (*syn.* URALEPIS).

Greenhouse or hardy perennial Grasses (*ord.* Gramineæ). Decumbens, the Heath Plant, is British, but neither it nor the other species is worth cultivation. Several species have been brought to this country.

TRIOLENA.

Stove herbs (*ord.* Melastomaceæ), of dwarf, rather dense, habit, bearing small rose or pink flowers. Propagation, by cuttings or seeds. Soil, two parts of peat, one part of leaf mould, and one part each of sand and loam.

Principal Species :—

scorpioides, 6″, sum., ro.

TRIOPTERIS (*syn.* TRIOPTERYS).

Stove climbing shrubs (*ord.* Malpighiaceæ), of little value, and rarely included in collections. Propagation, by cuttings of ripe shoots, in sand, in a close frame, with bottom heat. Soil, sandy peat.

Principal Species :—

rigida, My., bl., lvs. very rigid, leathery, and nearly round.

TRIOSTEUM.

Hardy herbs (*ord.* Caprifoliaceæ). Propagation, by division in spring or autumn, or by cuttings in summer. Soil, warm, light loam.

Principal Species :—

perfoliatum, 2′, Je., red.

TRIPHASIA.

Aurantiola (*syns.* diacantha, javanica, and trifoliata) is the only known species of this genus (*ord.* Rutaceæ). It grows 2′ high, and bears small, evergreen leaves and white flowers in June and July, followed by small, berry-like, edible fruit. It is increased by cuttings in heat. (For cultivation, *see* CITRUS).

TRIPTERYGIUM.

Wilfordii (*syn.* Bullockii), a hardy, prostrate shrub (*ord.* Celastrineæ) is the only known species in this genus. It sometimes attains a height of 2′ or 3′, and in summer it bears small white flowers. Increased by cuttings, grows in ordinary garden soil.

TRIPTILION.

Hardy or half-hardy herbs (*ord.* Compositæ), bearing alternate, sharply toothed leaves and heads of blue or white flowers. Propagation, the annuals from seeds, the perennials by division. Ordinary garden soil.

Principal Species :—

Achilleæ, 9″, Jy., wh.
cordifolium, 6″ Jy., ann., wh.
spinosum, 6″, Jy., per., bl.

TRISETUM.

Rostraria and Trichæte are included in this genus of hardy annual or perennial Grasses (*ord.* Gramineæ). Pratense (*syns.* flavescens and Avena flavescens), the only British species, is of more importance to the farmer than to the gardener, seeing that it is usually to be found among the Grasses that go to make up the best pastures.

TRISTAGMA.

Bulbous plants (*ord.* Liliaceæ), with radical, Grass-like leaves and umbels of white or yellowish flowers. They must be cultivated in rich, loamy soil in a sunny greenhouse.

Principal Species :—

narcissoides, 6″, spr., whitish yel.

Triphysaria (*see Orthocarpus*).
Triplet Lily (*see Brodiæa*).
Tripoly (*Aster Tripolium*).

TRITELEIA.

Dwarf, pretty, hardy or half-hardy bulbs (*ord.* Liliaceæ), now included in Brodiæa. They have usually small, flattened leaves, ranging in the various species from 3″ or 4″ to 12″ in length. The flowers are small and white, yellow, or bluish in colour. Propagation, by separating the bulbs and taking away the offsets when at rest. Soil, light, sandy loam. A warm border at the foot of a south or west wall makes a suitable home. After the death of the leaves the ground must be kept as dry as possible to ensure the proper ripening of the bulbs. Pot culture in a sunny frame may also be tried.

Principal Species :—

[NOTE.—The synonymy is that of the *Kew Hand-List*.]

aurea, 3″ to 4″, Ap., yel. (correctly Brodiæa aurea).
laxa, 1′ to 1½′, Jy., bl. (correctly Brodiæa laxa).
Leichtlini, 3″ to 4″, Jan., whitish grn. (correctly Brodiæa Leichtlini).
porrifolia, 6″ to 8″, Jy., whitish vio. (correctly Brodiæa porrifolia).
uniflora, 3″, Ap., My., lil. (correctly Brodiæa uniflora); several vars.

TRITHRINAX.

Ornamental stove Palms (*ord.* Palmæ), with roundish leaves, which have deeply divided margins. The sheaths of the leaves are conspicuous by reason of their intense spininess and the large quantity of loose fibre they produce. They are grown from imported seeds in rich, loamy soil under similar conditions to Thrinax.

Principal Species :—

acanthocoma, 10′ to 20′, lvs. large, margins divided into many segments.
aculeata (now Acanthorhiza aculeata).
brasiliensis, 10′ to 15′, lvs. 3′ long, nearly round.

TRITICUM. (WHEAT, WHEAT GRASS.)

With regard to number of species this (*ord.* Gramineæ) is quite a small genus, and yet it is of the greatest importance, seeing that the cultivated Wheat is referred to it.

Almost all the forms of the cultivated Wheat are placed under the species vulgare, æstivum and hybernum being good instances. Dioccum, monoccum, and Spelta, which take rank as distinct species, are also closely allied to vulgare. The notorious repens, popularly known as Couch Grass, and probably dreaded more than any other weed that can be named, is now removed from the genus Triticum and placed in Agropyrum, the specific name, repens, remaining the same. From a cultural point of view the farmer is more interested than the gardener in the Triticums. For hints as to the extermination of repens, *see* COUCH.

Principal Species :—

repens, 3′, sum., hdy. (correctly Agropyrum repens). Couch Grass, Cooch.
vulgare, 3′, sum., hdy. Wheat.

TRITOMA (*see* KNIPHOFIA).

TRITONIA.

Ornamental bulbous plants (*ord.* Irideæ), suitable for a sunny greenhouse or for warm positions out of doors. The genus is closely allied to Crocosmia, and includes the species which were at one time known as Montbretias. The flowering period extends over several weeks, and the flowers are usually brilliantly coloured. A large number of garden hybrids are in commerce, the majority of which are very handsome. Tritonias, whether grown in pots or in the open border, like rich, light, well-drained soil, and require thorough ripening and a prolonged season of rest.

Principal Species and Hybrids :—

crispa, 12″ to 15″, Ap., yel., wh.
crocata, 2′, Je., or.
crocosmiæflora, 2′ to 2½′ Jy., Sep., or. sc.; hybrid (Pottsii × Crocosmia aurea).
fenestrata (*see* hyalina).
hyalina, 1′, My., ro.
miniata (correctly crocata var.).
Pottsii, 3′, Aug., or., yel.
rosea, 1½′, Jy., ro.
squalida, 2′, My., whitish ro.

Other Species :—

aurea (now Crocosmia aurea).
longiflora (now Ixia paniculata).
odorata (now Freesia refracta).
refracta (now Freesia refracta).
securigera, 1′, My., br.

Select Garden Varieties :—

Aurore.
Bouquet Parfait.
Eldorado.
Elegans.
Étoile de Feu.
Fantaisie.
Gerbe d'Or.
Germania.
Solfatare.
Talisman.

TRIUMFETTA.

Stove or greenhouse trees, shrubs, or sub-shrubs (*ord.* Tiliaceæ). Propagation, by seeds or cuttings. Loamy soil.

Principal Species :—

acuminata, 8′ to 10′, sum., yel.
paniculata, 10′, sum., yel.
pilosa, 6′, sum., yel.

TRIXIS.

Herbs or sub-shrubs (*ord.* Compositæ) requiring greenhouse protection. Propagated by seeds. Soil, loam, leaf mould, and sand.

Principal Species :—

alata, 2′, Jy., yel.
mexicana, 2′, Aug., yel.

TRIZEUXIS.

Falcata is the only species (*ord.* Orchidaceæ). It is an epiphyte, requiring stove culture, of no horticultural value, but interesting to botanists on account of its untwisted ovary, a rare occurrence in the order. It grows about 9″ high, and bears green flowers.

TROCHETIA.

Evergreen trees or shrubs (*ord.* Sterculiaceæ), seldom cultivated. Propagation, by cuttings, in heat. Soil, loam, leaf mould, and sand.

Principal Species :—

blackburniana, 10′, My., grh., wh., edged ro.
Erythroxylon (now Melhania Erythroxylon).

TROCHOCARPA.

A small genus (*ord.* Epacrideæ), composed of stiff growing bushes and small trees of no horticultural value.

TROCHODENDRON.

Aralioides (*ord.* Magnoliaceæ) is the only species of this genus. It is an evergreen shrub, hardy in the south of England, grows 12′ to 16′ or more in height, and bears terminal racemes of green flowers in spring. The bark is aromatic. It is by no means common. Sandy soil with a little peat suits.

Tritomanthe Uraria (*see Kniphofia aloides*).

Trochostigma (*see Actinidia*).

TROLLIUS. (Globe Flower.)

Erect, hardy herbaceous perennials (*ord.* Ranunculaceæ) of much value for borders, for moist, shady positions, and for the bog garden. Propagation, by autumnal division and by seeds, which are slow in germinating. Soil, moist, heavy loam, enriched with manure.

Principal Species and Varieties :—

asiaticus, 1½′, My., dark yel.; stems one-flowered; aurantiacus and Fortunei are vars.
europæus, 2′, Je.; pale yel.; Albidus, dauricus, denyanus, giganteus, napellifolius, and Orange Globe are vars. Flore pleno is double. Newry Giant is very large. Boits, Common Globe Flower, Golden Ball, etc.

Other Species :—

acaulis, dwarf, Jy., golden yel.
altaicus, 1½′, or., yel.
americanus, 1′, My., greenish yel. to wh. (*syn.* laxus).
caucasicus, sum., yel.
dschungaricus, sum., yel., reddish outside.
japonicus, sum., yel.; flore pleno is a double var.
Ledebourii, 2′, My., yel.

TROPÆOLUM. (Golden Nasturtium, Indian Cress, and Yellow Larkspur.)

Hardy, half-hardy, and greenhouse annual and perennial climbing herbs (*ord.* Geraniaceæ), which are great favourites in gardens. Propagation, the annuals by seeds in heat in March or in the open in May; the perennials by seeds and by cuttings. Speciosum by division of the creeping rhizomes. Soil, light, sandy loam. They must always be given abundance of light, particularly the greenhouse species. The tuberous rooted species should be dried off during the autumn and stored in a frost-proof position during winter.

Principal Species, Hybrids, and Varieties :—

aduncum, hdy. ann. or grh. per., Je., yel., fringed (*syns.* canariense of gardens and peregrinum). Canary Bird Flower, and Canary Creeper.
azureum, Oct., grh., azure bl., grn., wh. claw.
— grandiflorum, larger.
— of Hooker (*see* violæflorum).
canariense (*see* aduncum).
Jarrattii, Je., grh., calyx or. sc., petals yellowish br.
Leichtlini, trailing, My., or. yel., red spots, useful for rockery; hybrid (polyphyllum × edule).
lobbianum, Nov., grh., or.; var. fimbriatum has fringed petals.
majus, Je., hdy. ann., or., reddish br.; for vars. *see* below. Great Indian Cress or Nasturtium.
minus, Je., hdy. ann., deep yel. or red; for vars. *see* below. Small Indian Cress.
peregrinum (*see* aduncum).
polyphyllum, prostrate, Je., hdy. per., yel.; likes a dry, sunny spot and no disturbance. Yellow Rock Indian Cress.
speciosum, Je., hdy., sc. Does well in Scotland, but not, as a rule, in the south. Flame Flowered Nasturtium.
tricolorum, Je., hlf-hdy., calyx or. sc., petals or.; regelianum and Schultzii are vars.
tuberosum, Sep., hlf-hdy., yellowish red; roots edible.

Other Species and Varieties :—

chrysanthum, sum., grh., golden yel.
edule, sum., hlf-hdy., or. grn.
pentaphyllum, My., grh. or hlf-hdy., calyx dull pur., petals vermilion, root tuberous (*syn.* Chymocarpus pentaphyllus).
Smithii (correctly aduncum var.).
umbellatum, Je., grh., or. red.
violæflorum, Oct., grh., bl., claws wh., root tuberous (*syn.* azureum of *Botanical Magazine* 3985).

Selection of Garden Varieties :—

Dwarf :—

atropurpureum nanum, pur. (*syn.* Tom Thumb).
atrosanguineum, blood red.
Aurora, ro., fawn, or red.
cæruleum roseum, ro., tinted bl.
Chameleon, primrose, crim. marks.
Cloth of Gold, lvs. yel.
Crystal Palace Gem, sulphur, maroon spots.
Empress of India, bright crim.
grandiflorum plenissimum, dull yel., maroon marks.
King of Tom Thumbs, sc.
King Theodore, very dark sc.
Ladybird, yel., veins crim.
Liliput, various, good for bedding.
Pearl, wh.
Scarlet King, sc., good for beds.
Terra cotta, buff, copper.

Tall :—

Asa Gray, creamy yel.
Brilliant, bright sc., crim. centre.
cardinale, sc., small.
Crystal Palace Scarlet, very showy.
Firefly, deep or., blood red.
Sunlight, yel. (*see p.* 409).

TROWELS.

Useful tools for transferring plants from pots to beds, and for transplanting small plants generally. They have a great advantage over the ordinary dibber, as by their aid the roots may be spread out to the best effect, and the holes may be made as large as required.

TROXIMON.

Dwarf, hardy annual or perennial herbs (*ord.* Compositæ). Propagation, by seeds; the perennials by division. Soil, sandy loam.

Principal Species and Variety :—

glaucum, 1′, My., per., bright yel.
— dasycephalum, involucre, woolly when young (*syn.* Ammogetum scorzoneræfolium).

TRUFFLES.

These esteemed esculents are Fungi (*ord.* Tuberaceæ) usually living below the surface of the soil, with no external signs to mark their presence beyond their peculiar smell. Truffle hunters employ specially trained dogs, and occasionally the services of pigs are enlisted, the keen sense of smell possessed by these animals pointing out the place where the Truffles lie concealed. Tuber æstivum is the species usually to be seen in the markets; it is generally to be found growing in the shade of Beech trees, but occasionally under Chestnuts, Birches, Hazels, and Oaks. Macrosporium and brumale are to be gathered under Oaks. The large White Truffle, Choiromyces albus, is occasionally in the market, but it is not so good as Tuber æstivum.

In Britain the Truffles obtained are the natural product of the soil, a chalky medium being usually preferred. It has been noticed that plantations of Beech trees on Salisbury Plain are commonly productive of Truffles. In France areas of chalky soils are enclosed, and sown with Acorns; Truffles make their appearance, and after about twelve years the plantation becomes profitable, and continues to be more or less so for upwards of twenty years. On the whole, however, the cultivation of

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Tromsdorffia (*of Blume, see Chirita*).
Tromsdorffia (*of R. Brown, see Dichrotrichum*).
Trottles (*Symphytum asperrimum*).
True Love (*Paris quadrifolia*).
Trumpet Flower (*see Bignonia*).
Trumpet Weed (*Eupatorium purpureum*).

Truffles is rather precarious, and attempts to infect the soil by watering with washings from sliced Truffles have so far proved unsatisfactory.

TRYMALIUM.

An obscure genus of greenhouse shrubs (*ord.* Rhamneæ). Billardieri, a tall shrub with hoary foliage, the only species worth mention, is increased by cuttings in sandy soil, in a close frame, or under a bell-glass. Soil, sandy loam and leaf mould in equal parts.

Photo : Cassell & Company, Ltd.

TROPÆOLUM SUNLIGHT (*see p.* 408).

TRYPHÆNA.

These night moths, which are closely related to Noctua and Agrotis, are popularly known as Yellow Underwings. The six British species vary in spread of the front wings from 1¼″ to 2¼″. The larvæ are placed with the Surface Caterpillars. Pronuba, the Common Yellow Underwing, is very frequently met with. The wings of the perfect insects are rather large, bright yellow in hue, with a narrow black marginal band. The larvæ do a good deal of damage to the roots of Lettuces and Cabbages, and when full fed pupate in the soil.

Ianthina, the Lesser Broad-bordered Yellow Underwing, is a rather smaller insect. Its larvæ attack the roots of Primroses and several other common garden plants. Interjecta is, as the popular name of Least Yellow Underwing denotes, the smallest of the three ; its grubs do not trouble the gardener much, since they subsist on the

roots of weeds. The caterpillars of fimbria feed upon the young leaves of Willows and Birches after living upon the older leaves in the autumn and passing the winter in a quiescent state. Orbona and subsequa are also common species. The same remedies as are set forth under the heading NOCTUÆ may be resorted to.

TSUGA.

Hardy evergreen Conifers (*ord.* Coniferæ), with comparatively slender and often pendulous branches, spirally scattered, very narrow leaves, and nearly round or oval cones. A number of the species and varieties are of elegant habit and appearance, and they are favourites with the lover of hardy trees. (For cultural details, *see* PINUS.) The timber of the Hemlock Spruce (canadensis), although elastic, is coarse and loosely built. It is, therefore, not in great demand. The bark of this species is used by tanners, and in Canada it is employed medicinally.

Principal Species and Varieties :—

[NOTE.—The synonymy is that of the *Kew Hand-List*.]

canadensis, 60′ to 80′, lvs. solitary, flat, cones oval, pendulous (*syns.* Abies americana, canadensis, and curvifolia, Picea canadensis, and Pinus americana and canadensis). Hemlock Spruce. Many vars., including :—

— albo-spica, young lvs. tipped wh.

— gracilis, branches slender, drooping.

— milfordensis, dwarf, branchlets drooping, slender.

— nana, 3′, dwarf, lvs. tufted.

— argentea, parvifolia, and pendula are at Kew.

hookeriana, lvs. spiny, pointed, closely set, cones cylindrical ovoid.

mertensiana, 100′ to 150′, close to canadensis, but has shorter, slenderer lvs. and red bark (*syns.* Abies albertiana, mertensiana, and pattoniana of McNab, not of Parl., Pinus canadensis of Bong. and P. mertensiana).

pattoniana, 100′ to 150′, lvs. light grn., cones narrowly oblong, 2″ to 3″ long, habit pyramidal (*syns.* Abies Williamsonii, and Hesperopeuke and Pinus pattoniana). Californian Hemlock Spruce.

— glauca, branches more pendulous, foliage glaucous.

Sieboldii, 80′ to 100′, lvs. solitary, cones 1″ long, elliptic (*syns.* Abies Araragi and Tsuga, Pinus Araragi and Tsuga, and Tsuga Tsuga). There is a dwarf var., nana.

Other Species :—

brunoniana, 70′ to 80′, lvs. solitary, cones 1″ long, solitary, sessile (*syns.* Abies dumosa and Pinus brunoniana and dumosa).

caroliniana, 50′ to 60′, lvs. larger and darker in hue than those of canadensis (*syn.* Abies caroliniana).

Douglasii (*see* Pseudotsuga Douglasii).

lindleyana (*see* Pseudotsuga Douglasii).

Roezlii, 50′ to 60′, cones 2″ long, habit like that of Cedrus Deodara.

TUBEROSE.

The Tuberose (Polianthes tuberosa, *see also* POLIANTHES) is really a half-hardy, tuberous subject, with its natural flowering season in autumn. The double varieties have, however, proved so remarkably amenable to forcing that the plants are generally treated as stove subjects, and the fragrant flowers are in great demand for buttonhole and bouquet work during the greater part of the year, and, given a good batch of "bulbs" (correctly tubers), it is not difficult to supply the demand. There are several varieties, including Double African, Double American, Double Italian, and The Pearl. Of these The Pearl is the most generally useful, and it is easy to grow, a free bloomer, and dwarfer in stature than the others. For good bulbs a 5″ pot is the best size, one bulb in each. The soil must be good—two parts of fibrous loam, one part of dried cow manure rubbed through a sieve, and sand. The drainage should be free, and the potting firm.

It is the usual plan to pot the whole of the tubers as soon as they are received in autumn, and consign them to a cold frame to make roots gradually. Little water is wanted at this stage; in fact, if the compost is moist to begin with, and the batch is in a north frame or pit, no heavy waterings will be required until the tubers begin to show signs of growth. An occasional sprinkling with the syringe is helpful. As flowers are required, batches of the plants which have started may be introduced to heat, and then liberal supplies of water become necessary. Plenty of heat, a liberal use of the syringe to keep down red spider and thrips, and liquid manure when the spikes are showing, are other items of culture. After the crop of flowers has been gathered the tubers may be sent to the rubbish heap; they are of little further use, although, if planted out in the open border, they now and again throw useful blooms in subsequent seasons.

A constant succession can be maintained by (*a*) having a good many tubers and (*b*) retarding them in a north frame until they are wanted.

TUBS.

Where large shrubs and small trees have to be grown in a portable condition for the furnishing of greenhouse or conservatory, wooden tubs are far more suitable to contain their roots than pots. Not only can the tubs be made of any size required, but they are less likely to be broken during shifting. If well made they will last for years, and it will be found false economy to attempt to save by using flimsy material in their construction. Holes must in all cases be bored in the bottom so as to let the drainage water escape readily. The outside may be painted three coats with any colour desired, but the inside should be left bare. If the tubs are over 2′ square the corners should always be strengthened with stout iron braces; these will add to the life of the receptacle by at least 50 per cent.

Plants growing in tubs should not need such frequent shifting as those in pots. Much may be done to keep them in health by top-dressings of rich soil occasionally, provided that thorough drainage is given in the first place.

The rustic tubs used for the ornamentation of the flower garden will be dealt with under VASES, which *see*.

TULBAGHIA.

Greenhouse or half-hardy perennial herbs (*ord.* Liliaceæ). The flowers are useless for cutting, owing to the strong, Garlic-like odour possessed by them, though their free-flowering propensities make them worth cultivating. Propagation, by seeds and division. Soil, light, sandy loam.

Principal Species and Varieties :—

alliacea, 15″, Je., grn., pur., red.

— affinis, stronger grower (*syn.* affinis).

— ludwigiana, 18″ to 24″, pur. (*syn.* ludwigiana).

natalensis, 12″, My., wh.

violacea, 18″, Je., pur., vio.

Tuber (*see Truffle*).

TULIPA. (TULIP.)

Description.—A genus of upwards of eighty species of hardy bulbous plants (*ord.* Liliaceæ), long prized in the garden, and of high value under glass or for cut flowers. The florists' varieties raised from gesneriana gave rise to the historic Tulip mania of the seventeenth century, and these flowers have long been largely grown in this country. The highest types of these are known as English Tulips, and they are of much beauty when well grown. The early-flowering Tulips are still more popular for beds, and also for growing in pots, for which their adaptability to forcing renders them very useful. The old Cottage Garden Tulips, generally blooming with the English varieties, are again coming into favour; while the quaint-looking Parrot Tulips are useful for hanging baskets and for the garden. The various species are also largely cultivated by hardy plantsmen, and comprise many charming flowers not generally known. Variegated-leaved Tulips are little grown in Britain, though pretty for pots or bedding.

Propagation.—By offsets, removed when the plants are at rest, or by seeds—a slow process—sown in a cold frame in boxes of light soil about the beginning of February.

Soil.—Loam inclined to sandiness in the open; in pots, about one part of thoroughly well-rotted cow manure to two of good loam, with a little sand.

Other Cultural Points.—From the beginning of October to the end of November is the most suitable time for planting in the open. In heavy soil they may be planted 3″ to 4″ deep, and in light soil 5″. For bedding or in borders 4″ to 6″ is a good distance to place them apart. It is seldom necessary to cover ordinary Tulips when grown in the open, but it is sometimes advisable to protect with loose litter if they pierce through the soil early. For the English Tulips, *see* the directions on p. 412.

In Pots and Forced.—The early Tulips are the best for this, planting from three to five bulbs in a 5″ pot, plunging the pots outside until root growth is made, when they are brought in as required and forced gently. For cut flowers and for jardinettes they may be grown in boxes, and cut, or lifted and placed in the jardinettes, as required.

Principal Species and Varieties:—

australis, 1¼′, Ap., yel., flushed red (*syns.* breyniana and celsiana).
billietiana, 2′, My., yel.; several vars.
clusiana, 8″, Je., wh., red, base blk.
— alba, wh., pur. outside.
gesneriana, 2′ to 3′, My., red; the parent of the florists' Tulips.
Greigi, 9″, Ap., red, yel., variable, good forms being æstuans, aurea, carminea, imperialis, picta, and Victoriæ.
kaufmanniana, 6″, spr., wh., yel., red, variable.
macrospeila, 2′, My., crim., blk. blotch.
Oculus-solis, 1½′, Ap., red, blk. blotches, yel. bordered.
patens, 6″ to 12″, My., yel. (*syn.* persica).
persica (*see* patens).
suaveolens, 6″, Mch., red, yel.
sylvestris, 1′ to 2′, Ap., My., yel.

Other Species, Hybrids, and Varieties:—

acuminata, 1′, Ap., red (*syn.* cornuta). Turkish Tulip.
Alberti, 2′, Ap., sc., yel., br.
altaica, 6″ to 9″, Ap., yel. or red.
Batalinii, 8″, Ap., lemon yel.
biebersteiniana, 1′, Ap., yel.
biflora, 6″, Ap., wh., eye yel.
bœotica, 1′, yel., red, blk.
Borszczowi, 1′, yel., blk.
chrysantha, 4″, yel.
ciliatula, 6″, Ap., crim.
concinna, 9″, Ap., crim.
cornuta (*see* acuminata).
cuspidata, 6″, Ap., sc. (*syn.* Elwesii).
dammanniana, 1′ to 1½′, Ap., pur.
Didieri, 2′, My., red, blotch blk. (*syn.* fransoniana).
— alba, wh.
edulis, 4″ to 9″, My., yel.
Eichleri, 10′, Ap., My., crim., blotch blk.
elegans, 1′, My., red, eye yel.
— alba, wh.
flava, 1′, Je., yel., segments banded grn.
fragrans, 6″ to 12″, Ap., yel.
grisebachiana (*see* orphanidea var.).
Hageri, 1′, Ap., red.
iliensis, 1′, spr., lemon yel.
Kesselringii, 1′, Ap., yel.
kolpakowskiana, 2′, Ap., sc. or yel.
lanata, 8″ to 15″, pur.
Leichtlini, 1′, pk., wh.
Levieri, sc., blotch blk.; near, if not a var. of, montana.
libanotica, 6″, pur.
limifolia, 6″, Ap., sc.
Lownei, 4″ to 6″, lil., yel.
maculata, 1½′, My., bright red.
maleolens, 1½′, Ap., red, odour slightly unpleasant.
Maximowiczii, 6″, Ap., sc., pur.
montana, 6″, Je., red.
Orphanidea, 1½′, My., yel.
ostrowskiana, 1½′, spr., red.
platystigma, 1′ to 1½′, My., ro., lil.; probable parent of Parrot Tulip.
polychroma, dwarf, near celsiana.
præcox, 2′, Ap., red, blotches blk.
primulina, 6″, spr., yel., red.
pulchella, 6″, spr., car., crim.
retroflexa, 1′, My., yel., petals reflexed.
saxatilis, 1′, Ap., mauve, pur.
scabriscapa, Ap., My., variable.
Schrenckii, 2′ to 3′, My., Je., pur. or yel.
Sintenisii, dwarf, pale red, sc.
spathulata, 2′ to 3′, My., Je., red, base blk.
Sprengeri, 9″ to 12″, Je., sc., very late.
stellata, 1′, Je., wh., flushed red.
— lutea, yel.
strangulata, 1¼′, Ap., yel., flushed ro.
sultanabadensis, sc., blotch blk., near undulatifolia.
thirkeana, 1′, Ap., yel., br.
triphylla, 6″ to 9″, Mch., lemon yel.
— Hoeltzeri, yel., pur.
turcica of Kunth (*see* acuminata var.).
turkestanica, 6″, Ap., wh., grn.
undulatifolia, 6″ to 9″, My., crim. red, blotch blk.
uniflora, Ap., yel., grn.
violacea, 6″, spr., mauve red.
viridiflora, 1′, Je., yel., grn.
— tardiva, greener, later.
vitellina, 1′ to 2′, My., pale yel. A hybrid.

Selection of Early-flowering Tulips:—

[NOTE.—These selections are necessarily limited, and reference to the dealers' catalogues is advised in addition.]

Doubles:—

Blanche Rosette, wh., ro.
Bride of Lammermoor, wh., ro.
Cramoisie Superbe, sc.
Emperor William, sc., edged yel.
Imperator Rubrorum, sc.
La Candeur, wh.
Leo XIII., sc., yel.
L'Innocence, wh.
Mariage de Ma Fille, wh., striped crim.; late.
Minnie Hauk, car. ro.
Overwinaar, wh., crim., vio.; late.
rosea perfecta, ro., streaked wh.
Rose Blanche, wh.
Salvator Rosa, ro.
The Moor, maroon, crim.
Vuurbaak, or., sc.
Yellow Rose, very sweet.

Singles:—

Artus, sc.
Bride of Haarlem, sc., feathered wh.
Chrysolora, yel.
Cottage Maid, ro., wh.
Crimson King, crim., sc.
Duc Van Thol, in var.
Franz Hals, wh.
Joost van Vondel, crim., wh.
Keizer's Kroon, sc., yel.

Lac Van Rhyn, cherry, wh. edge.
Ophir d'Or, yel.
Pottebakker, yel., sc., and wh.
Prince of Austria, brick red.
Scarlet Beauty, sc.
Vermilion Brilliant, sc.
White Swan, wh.
Wouverman, claret pur.
Yellow Prince, yel.

Late-flowering Cottage Tulips:—

Annie, yel.
Bridesmaid, ro., wh.
Buenaventura, sc., gold.
Dainty Maid, wh., lil.
Faerie Queen, heliotrope, yel.
Gala Beauty, vermilion, yel.
Golden Beauty, deep yel.
Golden Crown, yel., edged crim.
Golden Eagle, yel.
ixioides, yel., base blk.
La Panachée, wh., crim.
Othello, crim., centre dark.
Picotee, wh., edged ro.
Snowdon, wh., margin lil.
The Moor, deep crim.
York and Lancaster, wh., pk.
Zomerschoon, salmon, ro., wh.

Parrot Tulips:—

Amiral de Constantinople, sc., or.
Coffee Colour, yel., red br., crim.
Crimson Beauty, deep crim., blk.
Large Yellow, yel., crim., grn.
Markgraaf Van Baden, yel., sc.
perfecta, yel., sc.

Florists' Late-flowering or English Tulips.—*Cultivation.*—These can be grown in good loam, planted 4″ deep and 4″ to 6″ apart at the end of October or beginning of November. Shading from strong sun when in flower will prolong the blooms.

Classification.—There are three classes—(1) Bizarres, (2) Byblœmens, and (3) Roses, each subdivided into flamed and feathered. The Bizarres have a yellow ground flamed or feathered with shades of red, brown, and almost black. The Byblœmens and Roses have pure white grounds, the former being flamed or feathered with shades of purple, and the latter with scarlet or rose shades. In addition to these are the "Breeder" or self-coloured Tulips, the stage before "breaking" into the flames or featherings. These, like the others, ought to have a stainless base. The shape should be circular. The varieties named in the selections are not all in ordinary commerce.

Selection:—

Bizarres:—

FLAMED.	FEATHERED.
Dr. Dalton.	Commander.
Dr. Hardy.	Dr. Dalton.
Excelsior.	Garibaldi.
Masterpiece.	George Hayward.
Polyphemus.	Sir Joseph Paxton.
Sir Joseph Paxton.	Target.

Byblœmens:—

FLAMED.	FEATHERED.
Adonis.	Alice Grey.
Attraction.	Bessie.
David Jackson.	David Jackson.
Friar Tuck.	Nulli Secundus.
John Peacock.	Talisman.
Talisman.	Wm. Bentley.

Roses:—

FLAMED.	FEATHERED.
Annie McGregor.	Annie McGregor.
Lady Sefton.	Heroine.
Mabel.	Industry.
Mrs. Barlow.	Lady Wilton.
Sarah Headley.	Modesty.
Triomphe Royal.	Nanny Gibson.

Breeders:—

Bizarres:—

Ariosto. Excelsior. Sam Barlow.
Dr. Hardy. Goldfinder. Sir J. Paxton.

Byblœmens:—

Alice Grey. David Jackson. Martin's 117.
Ashmole's 114. Glory of Stakehill. Talisman.

Roses:—

Annie McGregor. Kate Connor. Mabel.
Constance. Lady Grosvenor. Mrs. Barlow.
Rose Hill.

Darwin Tulips:—

These are Breeder Tulips of a different strain, with dark purple bases, less perfect in colour or form, but brighter in the garden.

Dorothy, heliotrope, wh.
Early Dawn, vio., blush.
Fanny, pale ro., blush, wh.
Glow, vermilion, wh.
Leonardo da Vinci, maroon.
Loveliness, ro., blush.
Mrs. Krelage, ro., blush.
Pride of Haarlem, ro., sc.
Sir Joseph Hooker, sc.
The Sultan, maroon, blk.
Van Poortlivet, salmon, ro.
Virginia, rosy pur., grey, wh.

TUNICA.

Hardy annual and perennial herbs (*ord.* Caryophylleæ). Propagation, by seeds. Soil, light, sandy loam. Saxifraga, July, perennial, white, one of the two cultivated species, will grow on walls, banks, and in the rockery.

TUPIDANTHUS.

Calyptratus, the only species (*ord.* Araliaceæ), is a tall, greenhouse climber of little garden value. Propagation, by cuttings. Soil, light loam.

TUPISTRA (*syn.* PLATYMETRA).

Stove perennial herbs (*ord.* Liliaceæ), closely resembling Aspidistras. Propagation, by division. Soil, loam, peat, and sand.

Principal Species:—

macrostigma, Dec., dark pur. Mallet Flower.
nutans, Mch., vio., lurid pur.

TURF.

A name commonly applied to the close green sward of a lawn, synonymous with "grass" used collectively.

Laying turf is the alternative operation to sowing seed when a lawn is required. Where good turf, free from coarse Grasses, weeds, and moss, is obtainable, a lawn thus made comes into condition sooner than one from seed. If such material cannot be obtained seed may be sown. The sods may be cut to any size that is most convenient; usually 3′ long by 1′ wide is the size favoured. In cutting turf choose that from good pasture land where sheep have been feeding, for such grass is sure to be well nourished; mark out the size of the sods, and roll them up as they are cut. (*See also* TURF TOOLS.)

Probably the best time in the year for laying turf is early spring. If laid then it is in time for the warm spring rains, and is enabled to establish itself before the drought of summer comes. Still, turf can be laid in autumn, and all through the winter if mild weather holds, not in frosty spells. Turf

Tulip, African (*see Hæmanthus*).
Tulip-bearing Myrtle (*Darwinia macrostegia*).
Tulip, Butterfly (*see Calochortus lilacinus*).
Tulip, Drooping (*see Fritillaria Meleagris*).
Tulip, Golden Star (*see Calochortus pulchellus*).
Tulip Tree (*see Liriodendron*).
Tulip Tree, Laurel-leaved (*see Magnolia*).
Tullia (*see Pycnanthemum*).
Tupa (*Lobelia Tupa*).

should not be cut until it is wanted, and then the sooner it is laid down the better.

The site should be first forked over, levelled, the surface soil broken up fine, the stones raked off, and then it should be trodden until it is firm. If the sods have been neatly cut they will fit close together, but it is as well to work in a little fine soil with a broom, and follow up with a heavy beating with the turf beater. Where bare places have to be made good in paths or corners of lawns the old turf may be cut out and new let in, the preparations to be the same as before. For particulars as to nourishing turf, *see* LAWNS.

TURF TOOLS.

Of the edged tools needed, the edging iron is the most important. It has a half-moon shaped blade in line with a stout ash handle about 3½′ long. It is used for cutting the sods required for laying down, and also for trimming the edges of lawns and grass paths where they are trodden down and irregular. Where a straight run only is needed, the guiding line may be drawn quite tightly and the work will be easy. For cutting round curves it is the best practical plan to lay the line loosely down, and, having the iron very sharp, cut round the curve the line describes. It is far more trouble and less efficacious to put in pegs and stretch the line round them.

The turfing iron is a modification of the edging iron, and is used for lifting the sods after they have been marked out. The blade is heart shaped and thin. A spade will answer, but not nearly so well. While one man is cutting underneath another should be rolling up the turf as it is cut.

The turf beater may be made of a heavy block of wood with a flat surface, a stout handle being inserted at an angle that enables the operator to lift the block up to his shoulder, or nearly so, and hit the turf with the flat surface. (*See also* LAWNS.)

TURNERA.

A rather large genus (*ord.* Turneraceæ) of stove herbs, sub-shrubs, and shrubs with yellow flowers. The plants are, as a rule, rather weedy in appearance, but several of them make handsome specimens in spite of this defect. Propagation, by seeds and by cuttings, in sandy soil, in bottom heat, for the shrubs. The soil should be light and rich, the drainage free, and potting fairly firm.

Principal Species and Varieties :—

ulmifolia, 2′ to 4′, Je., to Sep., per. herb, lvs. wh. beneath. West Indian Holly, Sage Rose.
— angustifolia, lvs. narrower.
— cuneiformis, 1′ to 3′, yel., brn.
— elegans, 1′ to 2′, yel., brn.; in bloom almost constantly.

TURNIP.

Although not an indispensable vegetable, the Turnip (Brassica Rapa) is highly esteemed in many quarters. Its culture is for the most part easy, although a combination of a dry season and an attack of Turnip Fly is difficult to deal with. The principal point to aim at is to provide a continuous succession, and this often needs much care and forethought, as summer Turnips soon become strong, stringy, and uneatable. The best roots are produced upon a rather sandy loam, but passable ones can be taken from almost any soil, provided it is not deficient in lime. This is the Turnip's greatest need, and it possesses it in common with most Cruciferous plants. Superphosphate, bone meal, and old mortar rubbish are all valuable additions to the soil. Gas lime, in addition to providing lime, is also about the greatest deterrent to the troublesome Club disease.

Summer Turnips.—A very early crop may be obtained by sowing broadcast, under glass in January, upon a bed specially made up, in the same way as advised for Radishes. The earliest outdoor sowing may be made on a warm south border about the end of February. The frequency of the March, April, and May sowings will depend on the demand for the roots. An east or a north border should be chosen for the May sowings, for, if the position is hot and dry, the plants will "bolt" instead of bulbing. The seeds should be sown in rows about 1′ apart. Broadcasting is practised, but it is less reliable. A method followed with success in some quarters, is to draw drills 3″ or 4″ deep and of the same width, and nearly fill them with rotten cow dung or a mixture of fine soil and wood ashes, or soil and guano. These stimulants are covered thinly by a little of the ordinary soil, and the seed is sown on the top. A very quick growth is the result, and the plants are rushed past the stage at which the Turnip fly or beetle is most troublesome. Thinning, hoeing, and watering are routine items.

Winter Turnips.—The beginning of July is a good time to sow for the winter crop, and satisfactory results have been obtained from seed sown at any time between that date and the middle of September. The chief difficulty in a droughty season is to get the seed to germinate. Several sowings are sometimes necessary before a crop is assured. Much may be done by forking the ground over several times before sowing, and breaking it up finely, thus leaving a dust mulching upon the surface. Turnips may be broadcasted after Potatoes. If the latter are late a few "greens" only may be obtained, but they are better than allowing the land to lie idle.

A Selection of Varieties :—

For Summer :—

Early Red Milan. Early White Milan.
Early Six-weeks. Jersey Lily.
Early Snowball. Red Globe.

For Winter :—

Chirk Castle Black Stone. Golden Ball.

Pests and Diseases :—

Fungi.—The worst of these is undoubtedly the Club (Plasmodiophora Brassicæ) which has already been described under CABBAGE, CLUB ROOT. Oïdium Balsamii has sometimes to be reckoned with (*see* OÏDIUM). Peronospora parasitica is another Mildew; it has been dealt with under PERONOSPORA. Cystopus candicans is closely related to it, and may be subjugated in the same way.

Insects.—The Turnip Flea, Fly, or Beetle (Haltica, or Phyllotreta, nemorum) is the worst. The beetles feed upon the tender leaves of the young plants, and frequently work considerable havoc. They are black, very small, and very lively. The female beetles lay a few white eggs, which soon hatch, are full fed in about a week, and pupate in the soil. Both larvæ and beetles feed upon the leaves, which not infrequently are almost skeletonised as the result. There are several broods in a season. The

Turgosca (*see Crassula*).

chief methods of combating the beetles may be summed up as follows:—

(1) Clear off all Cruciferous weeds and burn all rubbish as soon as possible.
(2) Dig deeply in winter to bury the pupæ.
(3) Sow in drills instead of broadcast.
(4) Water overhead.
(5) Or dust with soot or lime.

The method of sowing in drills with manure in the bottom assists in pushing the plants past the stage at which an attack is to be feared. Thick sowing has been advised, but it is not a good plan to follow.

Ceutorhynchus sulcicollis is the cause of the galls so frequently seen upon the roots. The insect is small and black, and the galls are fleshy. Examination will reveal a small maggot in the cavity of each gall. Remedies: Cut off and burn the galls, and dress with gas lime some weeks before cropping. C. assimilis is grey instead of black, and feeds upon the flowers and young roots instead of the leaves. Remedies as for sulcicollis.

TURPINIA (*syns.* DALRYMPLEA, EYREA, LACEPEDEA, OCHRANTHE, and TRICERAIA).

Stove and greenhouse trees and shrubs (*ord.* Sapindaceæ) with white flowers in panicles. Propagation, by cuttings of ripe shoots in sand in a close case in heat. Soil, peat and loam in equal parts with sand. For Turpinia of Persoon *see* POIRETIA.

Principal Species:—

arguta, 3′ to 4′, Mch., grh. shr. (*syn.* Ochranthe arguta).
insignis, 20′, My., st., fragrant (*syn.* Lacepedea insignis).
occidentalis, 20′ to 30′, My., st. tree, fruits dark bl. Cassava Wood.
pomifera, 18′ to 25′, My., st., fruits red, pur., yel., or grn. (*syn.* nepalensis).

TURRÆA.

Stove and greenhouse shrubs (*ord.* Meliaceæ), not often grown. Propagation, by cuttings of ripe shoots, from which none of the leaves should be taken, rooted in sand in heat. Soil, loam and peat in equal parts, with sand.

Principal Species:—

obtusifolia, 4′ to 6′, My., grh. shr., lvs. wh., usually three lobed.

Other Species:—

heterophylla, My., st. shr., wh. (*syn.* lobata of *Botanical Register* XXX., 4).
rigida (now Quivisia chilosantha)

TUSSACIA.

A small genus of stove herbs (*ord.* Gesneraceæ) with creeping, branching rhizomes. The calyx is large, often bright scarlet, and is one of the showy features of the flower. Few of the species are in cultivation, but those that are have proved not difficult to grow if treated in the same way as the Gesneras, which *see*.

Principal Species:—

pulchella, 1′, Jy., st., corolla yel., calyx red (*syn.* Besleria pulchella).

Turnsole (*see Heliotropium*).
Turpentine Moth (*see Tortrix*).
Turpentine Tree (*Pistacia Terebinthus, Abies. and Pinus*).
Turritis (*see Arabis*).

Other Species:—

semi-clausa, sum., st., calyx red, corolla yel. There are several vars., with vio. stems and petioles

TUSSILAGO. (COLT'S-FOOT.)

As now composed the genus has only one species (*ord.* Compositæ), and it has a reputation not altogether enviable. The wild Colt's-foot, Farfara, is a pretty plant when it is starring railway embankments and stretches of waste land with its yellow flowers early in the spring, but it is a troublesome weed in gardens, especially where the soil is heavy and inclined to be at all damp. Weed as it is, the plant has economic value, for the leaves, made into cigars, are given to asthmatic patients to smoke. The variegated form may be readily multiplied by dividing the rhizomes in autumn. Almost any soil will do for it, provided it be not very dry.

Only Species and its Variety:—

Farfara, 4″ to 10″, Mch., Ap., hdy. per.
— variegata, lvs. heart shaped, blotched creamy wh. Becomes a weed if once established.

TYCHIUS.

Peas are sometimes plagued—not so frequently in Britain as elsewhere—by a lively little weevil, Tychius quinque-maculatus, whose larvæ feed upon the seeds of the Peas inside the pod. When they are full fed they drop to the ground, pupate in the soil, and hatch into beetles in the autumn. The beetles, which are black, lined and spotted white above, and black below, pass the winter in the ground, the females getting to work next spring to lay eggs in the ovaries of the young flowers. Nothing can be done with the pests inside the pods, but dressing the ground in the autumn with soot is helpful, as it tends to reduce the number of the beetles.

TYDÆA (*see* ISOLOMA).

TYLENCHUS.

A genus of Nematoid worms or Eelworms which frequently work great damage to garden crops, especially those with tender and fleshy roots. They differ considerably from the true worms, and are exceedingly small, hair-like creatures, white, and not visible except by means of a rather powerful magnifying glass. They have a mouth but no head properly so called. Some of the species live in the roots, others in the green parts of plants, setting up galls. Of the most important species, Tritici makes galls in the ovaries of Wheat, and devastatrix attacks the stems and flowers of the Rye, several other Grasses, and a number of other garden plants. Further particulars and methods of treatment have been given under NEMATOID WORMS and EELWORMS.

TYLOPHORA.

Stove sub-shrubs or herbs, usually twiners (*ord.* Asclepiadeæ), with small flowers and opposite leaves. All those named below are twining sub-shrubs, which may be grown in the same way as the Hoyas; they are of much less garden value, however.

Tussacia (*of Klotzsch, see Catopsis*).
Tutsan (*see Hypericum Androsæmum*).
Tweedia (*see Oxypetalum*).
Twin-flower (*see Bravoa geminiflora*).
Twisted Stalk (*see Streptopus*).
Tyle Berry (*Jatropha multifida*).

Principal Species :—

asthmatica, 5′, Nov., grn. (*syn.* Cynanchum viridiflorum of *Botanical Magazine* 1929). East Indian Ipecacuanha).
barbata, 10′, Jy., dull pur.
grandiflora, 10′, Jy., pur.

TYPHA. (Bullrush, Cat's Tail, Club Rush, Reed Mace.)

Stove or hardy, marsh loving plants (*ord.* Typhaceæ), of which the hardy species are the best known and the most valuable. They are elegant subjects for planting by the side of ornamental water, the long, gracefully arching leaves giving the plant a distinguished appearance, even when there are no flowers. If gathered early in the autumn the flower spikes will last a long time, and be useful for winter decorations. Seeds and division of the rhizomes may both be relied upon to work up a stock. If planted right in the water it will not be advisable to have this more than 1′ deep.

Principal Species :—

angustifolia, Jy., hdy., br., spikes ½″ to ¾″ in diameter. The plant is really a smaller edition of latifolia. Small Bullrush. British.
latifolia, 3′ to 7′, Jy., Aug., spikes 6″ to 12″ long, lvs. 3′ to 6′ long. Cat o'Nine Tails, Marsh Beetle. British.

TYPHONIUM.

Tuberous perennial herbs (*ord.* Aroideæ) all needing a stove temperature. The leaves vary from sagittate (arrow-head shaped) to three or five lobed. Propagation, by division of the tubers in early spring, before growth begins. The divisions should be started in a close pit. The soil must be light and rich, and a few pieces of charcoal are an improvement. After the plants have died down in the autumn little moisture is needed until spring; in this respect the Typhoniums are much like the Caladiums.

Principal Species :—

[Note.—s. = spathe, sp. = spadix.]

Brownii, Ap., s. pur., lvs. three lobed.
trilobatum, 1½′, s. grn., rosy pur., sp. cylindrical, lvs. halberd shaped (*syns.* orixense and Arum orixense).

Other Species and Varieties :—

cuspidatum, 1′, s. grn., sp. wh., lvs. sagittate or hastate (*syn.* Arum flagelliforme).
diversifolium huegelianum, s. 4″ to 7″ long, grn., dark purplish br., sp. shorter than s., lvs. variable (*syn.* Heterostalis huegeliana).
giganteum, pedatum, and Roxburghii are in the Kew collection.

TYTONIA.

The name of this genus of one species (*ord.* Geraniaceæ) is kept up here for cultural purposes. The plant is a stove aquatic, very beautiful, easy to grow, propagated by seeds sown in spring in heat, and liking a rich, loamy soil.

Only Species :—

natans, Jy., Sep., st., red, wh., and yel. (correctly Hydrocera angustifolia).

ULEX. (Furze.)

Hardy spinous evergreens (*ord.* Leguminosæ). In addition to its beauty when in flower, Furze has value as a fodder plant, and for fences. Propagation, by seeds in spring, in light, well-drained soil; the double and Irish Furze by cuttings in autumn, in a cold frame. Soil, light, deep loam.

Principal Species and Varieties :—

europæus, 4′ to 6′, spr., yel.
— flore pleno, sum., yel.; very beautiful.
— nanus (*see* nanus).
— strictus, 4′ to 6′, sum., yel. Irish or Upright Furze.
Galli, 3′, aut., yel.
nanus of gardens (not Forster; *see* Genista hispanica).
nanus (Forster), 3′, aut., yel. (*syn.* europæus nanus).
parviflorus, 4′, sum., yel. (*syn.* provincialis).

ULLUCUS.

A hardy, tuberous-rooted plant (*ord.* Chenopodiaceæ) that is rarely seen in this country. Propagation, by division. Any light garden soil.

Only Species :—

tuberosus, 2′, Aug., yel. (*syn.* Basella tuberosa).

ULMUS. (The Elm).

Valuable forest trees (*ord.* Urticaceæ) that are grown for the formation of avenues, occasionally as single specimens, and commonly as park trees. Their disadvantage lies in the trees sometimes casting several feet of their top growth in hot weather. All the species produce small greenish or reddish flowers in spring. Propagation, by budding, suckers, and layers for campestris and its many varieties, also by grafting upon montana. The last-named is best increased by seeds sown as soon as ripe, but may also be grown from suckers and layers. Soil, deep, well-drained, sandy loam. Elms growing well are commonly taken as indicating a good soil for Apples and Pears.

Principal Species and Varieties :—

alata, 30′ to 50′, branches winged (*syn.* pumila of Walter; *see p.* 419).
americana, 50′ to 100′ (*syns.* alba, floridana, and mollifolia). White Elm.
campestris, 50′ to 120′ (*syns.* angustifolia, nemorosa, and nuda). Common Elm.
— antarctica, lvs. small.
— antarctica aurea, lvs. bronzy yel.
— Berardi, small, lvs. stiff, growth erect.
— betulæfolia, lvs. Birch-like.
— gracilis, branches slender.
— latifolia, lvs. very broad.
— latifolia variegata, lvs. broad, variegated.
— pendula nova, weeping.
— suberosa. Cork-barked Elm.
— variegata, creamy wh.
— viminalis, twiggy; very elegant.
— viminalis variegata; makes a pretty specimen.
glabra, 50′ to 80′ (*syns.* carpinifolia, inæqualis, nitens, and suberosa glabra). Wych Elm.
— cornubiensis, lvs. small. Cornish Elm.
— pendula, weeping.
montana, 60′ to 120′ (*syns.* fulva of gardens, major, and scabra). Scotch Elm.
— atropurpurea. lvs. dark.
— aurea, lvs. yel.
— crispa, stunted growth, lvs. crisped (*syns.* adiantifolia, asplenifolia, crispa, effusa crispa, and urticæfolia).
— Dovæi, erect, lvs. yel.
— fastigiata, erect (*syns.* Dampieri, exoniensis, Fordi, ohioensis, and plumosa).
— fastigiata aurea, lvs. bright yel. (*syns.* Dampieri aurea and Wredei.)
— macrophylla, lvs. large.
— nana, dwarf.
— pendula, weeping.
— pendula variegata, lvs. variegated.
— Pitteursii pendula.
— vegeta, very strong grower; a handsome avenue tree. Huntingdon Elm.

Ulcer (*see Apple Canker*).

Ulloa parasitica (*Juanulloa aurantiaca*).
Ulmaria (*see Spiræa Ulmaria*).

Other Species :—

adiantifolia (*see* montana crispa).
alba (*see* americana).
angustifolia (*see* campestris).
asplenifolia (*see* montana crispa).
carpinifolia (*see* glabra).
chinensis (*see* parviflora).
crispa (*see* montana var.).
Dampieri (*see* montana fastigiata).
— aurea (*see* montana fastigiata sub-var.).
effusa (*see* montana crispa and pedunculata).
exoniensis (*see* montana fastigiata).
floridana (*see* americana).
Fordi (*see* montana fastigiata).
fulva of gardens (*see* montana).
fulva, 20′ to 40′ (*syn.* rubra). Red Elm.
inæqualis (*see* glabra).
major (*see* montana).
mollifolia (*see* americana).
nemorosa (*see* campestris).
nitens (*see* glabra).
nuda (*see* campestris).
octandra (*see* pedunculata).
ohioensis (*see* montana fastigiata).
parviflora, 3′ to 10′ (*syns.* chinensis, pumila of gardens, Microptelea parvifolia, and Planera parvifolia).
pedunculata, 30′ to 60′ (*syns.* effusa, octandra, and racemosa of Borkh.)
plumosa (*see* montana fastigiata).
pumila (*see p.* 417).
scabra (*see* montana).
suberosa (*see* campestris var. and glabra).
urticæfolia (*see* montana crispa).
Wredei (*see* montana fastigiata aurea).

UMBELLULARIA.

Hardy evergreen trees (*ord.* Laurineæ). Propagation, by cuttings and layers in late summer. Ordinary well-drained soil.

Principal Species :—

californica, 60′, Je., greenish yel. (*syns.* Drimophyllum pauciflorum, Oreodaphne californica, and Tetranthera californica).

UMBER MOTHS.

This is the popular name bestowed upon two species of Geometer or Looper Moths, of the genus Hybernia. Defoliaria, the Mottled Umber, has a brown body, with two rows of dark spots upon the abdomen. The forewings are of some shade of reddish brown, with dark cross bands and black central spots. The larvæ are cylindrical, have six legs in front, and four prolegs or claspers behind, are yellow and brown, and feed voraciously upon the leaves of many trees in spring. The perfect insects appear in autumn, and, as the females are wingless, grease banding the trees is very helpful. Spraying, as for the Winter Moth, is an effectual method of dealing with the caterpillars, and, in cases of bad attacks, the soil beneath the trees may be dressed with gas lime in autumn. The gas lime must, however, not be allowed to come into direct contact with the roots while it is fresh.

Aurantiaria is called the Scarce Umber. The insects and caterpillars are like those of the Mottled Umber in both general appearance and habits, and the same remedies may be tried. (*See also* HYBERNIA.)

UNCIFERA.

A small family of erect growing stove Orchids (*ord.* Orchidaceæ), allied to Saccolabium. Block or basket culture suits, with peat and sphagnum for compost.

Principal Species :—

heteroglossa, 1′, sum., wh.

UNGERNIA.

Cool greenhouse or hardy bulbous plants (*ord.* Amaryllideæ). Propagation, by offsets. Soil, three parts loam and one part each decayed leaf mould and decomposed manure, with coarse sand.

Principal Species :—

trisphæra, 9″, sum., red (*syn.* Lycoris Sewerzowii).

UNGNADIA.

Deciduous shrubs or small trees (*ord.* Sapindaceæ), not hardy about London. Propagation and culture are the same as for Æsculus (which *see*).

Principal Species :—

speciosa, 20′, spr., pk.

UNICORN BEETLE.

The name Unicorn Beetle, bestowed upon Copris lunaris, is due to the presence upon its head of a single curiously shaped horn. The beetles are glossy black in colour, and may easily be distinguished from other beetles. They are really friends to the gardener, for the females carry dung into their underground burrows to nourish their larvæ upon. In no case have they been proved to be directly harmful.

UNIOLA. (SPIKE GRASS.)

Hardy perennial Grasses (*ord.* Gramineæ). Propagation, by seeds and division. Any ordinary garden soil.

Principal Species :—

latifolia, 4′, Aug., grn.
paniculata, 8′, Aug., grn.

UNONA.

Stove evergreen shrubs (*ord.* Anonaceæ). Propagation, by cuttings in early summer, in very sandy soil, under a bell-glass, over bottom heat. Soil, equal parts fibrous loam and peat, with coarse sand.

Principal Species :—

discolor, 10′, sum., yellowish grn.

URARIA.

Evergreen stove shrubs (*ord.* Leguminosæ). Propagation, by cuttings of short side growths in early summer, in sand, in a close case. Soil, mellow loam, fibrous peat, and sand.

Principal Species :—

crinita, 3′ to 6′, Jy., pk.
Lagopus, 3′, Jy., wh. (*syn.* alopecuroides).
picta, 3′ to 6′, Jy., pur.

URCEOCHARIS.

An artificial genus (*ord.* Amaryllideæ), produced by crossing Eucharis grandiflora and Urceolina pendula. The result is a useful hybrid stove plant of somewhat dwarfer growth than the Eucharis,

Umbilicus (*see Cotyledon*).
Umbrella Leaf (*Diphylleia cymosa*).
Umbrella Pine (*see Sciadopitys verticillata*).
Umbrella Plant (*see Saxifraga peltata*).
Umbrella Tree (*Magnolia tripetala*).
Umbrella Wort (*see Oxybaphus*).
Uncinula spiralis (*see Oïdium Tuckeri*).
Underground Onion (*see Potato Onion*).
Unicorn Plant (*see Martynia lutea and proboscidea*).
Upas Tree (*see Antiaris toxicaria*).
Upland Willow Oak (*see Quercus cinerea*).
Upright Portugal Laurel (*see Prunus lusitanica myrtifolia*).
Urania (*see Ravenala*).
Uranthera (*see Acisanthera*).

bearing white, pendulous flowers on stout spikes. The same culture as for Eucharis suffices, with a reduced water supply after the leaves have matured.

Principal Species :—

pendula, Je., yel., grn., pendent, umbels many flowered (*syns.* aurea of gardens and Collania urceolata).

Photo: Cassell & Company, Ltd.

ULMUS PUMILA (*see p.* 416).

Only Hybrid :—

Clibrani, $1\frac{1}{2}'$, spr., sum., wh.

URCEOLINA (*syns.* COLLANIA and URCEOLARIA).

A small genus of bulbous plants (*ord.* Amaryllideæ), requiring a greenhouse temperature. Propagation, by offsets. Soil, fibrous loam and leaf mould in equal parts, with sand.

Other Species :

aurea of gardens (*see* pendula).

latifolia, Ap., yel., red, grn. tipped (*syn.* Leperiza latifolia).

miniata, Sep., cinnabar red or sc., nodding, bulb large (*syn.* Pentlandia miniata).

URECHITES.

Stove under-shrubs (*ord.* Apocynaceæ) of prostrate or twining habit, rarely to be seen in gardens,

and of little value. They may be treated in the same way as Dipladenias (which *see*).

Principal Species :—

sub-erecta, My., st., yel. (*syns.* Dipladenia flava and Echites sub-erecta).

URENA.

Stove annual herbs (*ord.* Malvaceæ), possessing little horticultural value. Propagation, by seeds sown in spring, in brisk heat. Any light, rich compost suits.

Principal Species :—

lobata, 3′, Jy., pk.

URGINEA.

Greenhouse bulbous plants (*ord.* Liliaceæ). Propagation, by offsets. Soil, loam, leaf mould, and sand.

Principal Species :—

altissima, 3′, My., wh., grn. (*syn.* Drimia altissima).
exuviata, 6″, Je., wh., pur. (*syn.* Albuca exuviata).
filifolia, 9″, Je., wh., pur. (*syn.* Albuca filifolia).
maritima, 3′, aut., wh., grn., pur. Sea Onion.

URINE.

The urine of most animals is of greater manurial strength than their solid excrement, and unless highly diluted it may do more harm than good to any growing crop to which it may be applied. Urine contains much ammonia, chiefly united with acids, and consequently is a valuable nitrogenous fertiliser, especially after being stored for some time. It may be either used in liquid form, mixed with six times its bulk of water, for fruit trees and the stronger growing kitchen garden crops, or it may be mixed with dry soil and gypsum, and applied in a dry state as a top-dressing. Sulphuric acid added to urine prevents loss of ammonia by evaporation, by the formation of sulphate of ammonia. Urine should not be wasted, and if it is not possible to store it for future use it should be poured on to unoccupied land that is shortly to be dug.

UROCYSTIS.

This genus of parasitic fungi (*ord.* Ustilaginaceæ) is included in the group of Smuts, and they have already been alluded to under the latter heading (which *see*).

UROSKINNERA.

Stove herbaceous plants (*ord.* Scrophularineæ). Propagation, by cuttings in sand, in a close case. Soil, loam and sand.

Principal Species :—

spectabilis, 1½′, Jy., rosy pur.

UROSPATHA.

Moisture loving stove plants (*ord.* Aroideæ) Propagation, by division. Though seldom cultivated, all the species are easily grown in light, rich soil, if given plenty of heat and moisture when growing. Little water is needed when growth is complete.

Uredo (*see Puccinia*).
Uropappus (*see Microseris*).
Uropedium (*see Selenipedium*).
Urepetalum (*see Dipcadi*).

Principal Species :—

desciscens, 3′, sum., spathe br., dark pur.
sagittæfolia, 3′, sum., spathe yel., grn., mottled red ; elegans, grandis, picturata, spectabilis, and splendens are vars.

UROSPERMUM.

Hardy herbs (*ord.* Compositæ). Propagation, by seeds sown in spring. Any ordinary garden soil.

Principal Species :—

Dalechampii, 2′, Jy., per., yel. (*syn.* Arnopogon Dalechampii).
picroides, 1′, Jy., ann., yel. (*syn.* Arnopogon picroides) ; asperum and capense are vars.

URSINIA.

Greenhouse or half-hardy herbs or shrubs (*ord.* Compositæ). Propagation, by cuttings beneath a glass, in or out of doors according to the species. Soil, loam and peat.

Principal Species :—

anthemoides, 9″, Aug., pur., yel. (*syns.* Arctotis anthemoides and Sphenogyne anthemoides).
crithmifolia, 1½′, Jy., yel. (*syn.* Sphenogyne crithmifolia).
pilifera, 1¼′, win., yel., pur. (*syn.* Sphenogyne pilifera).
pulchra, 9″, Aug., or., yel. (*syn.* Sphenogyne speciosa). Sulphurea is a fine var.

URTICA.

Although of no horticultural value, this genus (*ord.* Urticaceæ) is interesting in some degree. It includes over thirty species of annual or perennial herbs, all characterised by the more or less virulent stinging hairs on leaves and stems. The tender tops of the common Stinging Nettle make a palatable vegetable when boiled, while country folk use a decoction known as Nettle tea for a variety of minor ailments. Nearly all the species produce good fibre, but with rare exceptions this is seldom used commercially. The tropical U. spatulata is so violent in its action that persons severely stung by it may lose their lives. U. ferox, a New Zealand species, is another notorious plant, as is also the Japanese Laportea stimulans.

URVILLEA.

Stove climbing shrubs (*ord.* Sapindaceæ), of little garden value. Propagation, by cuttings in sandy soil, in a close case. Soil, peat and loam.

Principal Species :—

ferruginea, 12′, Je., wh.

UTRICULARIA. (Bladder Wort.)

Beautiful and interesting plants (*ord.* Lentibularieæ) that may be either aquatic, epiphytal, or terrestrial. The aquatic species have tiny pitchers on the leaf segments, and these have very small, valve-like lids that admit animalculæ, but do not permit their escape. The captives are retained until the plant has absorbed all the nutritive matter from their decomposed bodies. Several species produce winter buds that fall to the bottom of shallow water, and remain there until the warmth of the succeeding spring excites them into growth. Montana is the most commonly grown species. Propagation, by division, or by winter buds, when these are formed, or by separation of the tubercles in some cases. Soil, sphagnum and a little fibrous peat, in baskets suspended in a stove or greenhouse, and provided with abundance of moisture.

Urostigma (*see Ficus*).

Principal Species :—

Endresii, 4′, spr., sum., warm grh., grn., lil., yel. (*syn.* montana rosea).
Humboldtii, 6″, spr., st., bl., pur.
ianthina, 6″, sum., bl., marked yel., vio.
montana, 6″, sum., st., wh., yel. disc.

Other Species :—

bifida, 3″, sum., grh., yel.
forgetiana (*see* longifolia).
intermedia, 4″, sum., hdy. aquatic, yel.
longifolia, 8″, spr., vio., disc yel.
minor, 6″, sum., hdy. aquatic, yel.
montana rosea (*see* Endresii).
reniformis, 2′, sum., st., ro.

small trees (*ord.* Vacciniaceæ), usually producing small edible berries, which are often used for domestic purposes. The small flowers are generally produced in spring. Those named are hardy and deciduous, unless otherwise indicated. The greenhouse species should be placed outdoors in summer. Propagation, by seeds, sown in spring. Soil, peat and sand, in a moist place, suit the hardy species.

Principal Species and Varieties :—

albiflorum (*see* corymbosum pallidum).
arboreum, 6′ to 24′, spr., pennsylvanicum, 9″ to 15″, wh. or rosy, fruit bluish blk. (*syns.* humile,

Photo: Cassell & Company, Ltd.

ULMUS ALATA (*see p.* 415).

UVARIA.

Stove evergreen shrubs (*ord.* Anonaceæ) whose propagation and culture are similar to Unona (which *see*).

Principal Species :—

Kirkii, 4′, sum., dull yel., tinted grn.
zeylanica, 15′, sum., sc.

UVULARIA.

Hardy herbaceous perennials (*ord.* Liliaceæ). Propagation, by division in spring. Soil, sandy loam.

Principal Species :—

grandiflora, 1′, My., yel.
perfoliata, 1′, My., yel.
sessilifolia, 6″, Je., yel.

VACCINIUM. (BILBERRY, CRANBERRY, BLUE BERRY, and HUCKLEBERRY.)

A large genus, comprising upwards of 130 species of generally hardy shrubs, or occasionally

Uva Grass (*see Gynerium saccharoides*).
V Moth (*see Moths*).

wh., fruit blk. (*syn.* diffusum). Farkleberry.
corymbosum, 5′ to 10′, spr., wh., fruit bluish blk.
— amœnum, lvs. bright grn. (*syn.* amœnum).
— fuscatum, lvs. rather ciliated.
— pallidum, a pale, glaucous form.
erythrinum, 1½′, Oct., grh. ev., red.
formosum, 2′ to 3′, sum., rosy red, fruit bl.
leucobotrys (*see* serratum var.).
Mortinia, 2′ to 3′, spr., hlf-hdy., rosy pk.
Myrtillus, 6″ to 24″, spr., rosy, fruit dark bl. Bilberry, Blaeberry, Blueberry, Whortleberry, etc.
myrtilloides [Michx. not Hook], ramulosum, and tenellum).
— angustifolium, 6″ to 9″, lvs. narrow (*syns.* angustifolium and salicinum).
serratum, 4′ to 7′, sum., grh., wh., fruit wh.
— leucobotrys, flowers in clusters, yel., fruit wh.
stamineum, 2′ to 3′, spr., pur., or yellowish grn. (*syns.* album [Pursh], and elevatum). Deerberry, Squaw Huckleberry.
Vitis-Idæa, 6″ to 18″, spr., hdy. ev., pk., fruit red (*syns.* punctatum and Vitis-Idæa punctatum). Cowberry, Brawlins, Flowering Box, etc.
— major, larger form.
— variegata, lvs. variegated.

Other Species, Hybrids, and Varieties :—

brachycerum buxifolium of Salisbury (now Gaylussacia brachycera).
cæspitosum, 3″to 6″, spr., ro. or wh., fruit bl.
canadense, near pennsylvanicum, grh., wh. (*syn.* album).
dumosum (now Gaylussacia dumosa).
erythrocarpum, 1′ to 4′, sum., flesh, fruit red, passing to blk.
hirsutum, 1′ to 2′, spr., wh. or ro., fruit bluish blk.
Imrayi (now Hornemannia martinicensis).
intermedium, hybrid (Myrtillus × Vitis-Idæa).
Myrsinites, 9″to 24″, sum., hdy. or hlf-hdy. ev., wh. or ro,, fruit bl. (*syns.* Sprengelii [of gardens, not Wall.] and nitidum decumbens).
myrtilloides, 1′ to 5′, spr., greenish wh., fruit pur. blk.
nitidum, 1′ to 2′, spr., ev., ro., fruit blk.
— decumbens (*see* Myrsinites).
ovatum, 3′ to 5′, spr., hdy. or hlf-hdy., ro., fruit reddish to blk. (*syn.* prunifolium of gardens).
Oxycoccus (now Oxycoccus palustris).
prunifolium (*see* ovatum).
reflexum, Jan., grh. ev., red.
resinosum (now Gaylussacia resinosa).
Rollisoni, 2′, st.ev. shr.,sc.
rugosum (now Pentapterygium rugosum).
serpens (now Pentapterygium serpens).
uliginosum, 6″to 12″,spr., pk.
virgatum, 3′, spr., ro., fruit blk.
— tenellum, dwarf,white.

VAGARIA.

A monotypic genus (*ord.* Amaryllideæ), consisting of a half-hardy bulbous plant, parviflora, probably not in cultivation.

VALDIVIA.

Valdivia gayana is a dwarf, half-hardy shrub (*ord.* Saxifrageæ), with red flowers on short stems, probably not at present in cultivation.

VALERIANA. (Valerian.)

A large genus of hardy, half-hardy, or greenhouse herbs, sub-shrubs, or shrubs (*ord.* Valerianeæ), of which only a few of the best need be described, many being of no value. The herbs are propagated by division or seeds in spring; the others by cuttings under glass. Common soil.

Principal Species and Varieties :—

angustifolia (now Centranthus angustifolius).
arizonica, 6″, sum., pk.
Calcitrapa (now Centranthus Calcitrapa).
Cornucopiæ (now Fedia Cornucopiæ).
dioica, 6″ to 8″, sum., ro. Marsh Valerian.
montana, 9″, Jy., pk.
— rotundifolia, dwarfer, lvs. rounder.
officinalis, 3′, Je., pk. ; a medicinal plant. Common Valerian, All-heal, St. George's Herb, etc.
Phu, 2′, Aug., wh.
— aurea, lvs. yel. in spr.; worth growing.
ruthenica sibirica (now Patrinia sibirica).

VALERIANELLA.

Small, generally annual, herbs (*ord.* Valerianeæ), of which only a few are worth growing. The seeds should be sown in spring, and the plants cultivated in common soil. The undernamed are the Corn Salads (*see* Salads).

Principal Species :—

carinata, whitish. Corn Salad.
olitoria, 6″ to 12″, My., pale lil. Common Corn Salad, White Potherb, Lamb's Lettuce.

Vaginaria (*see Vagaria*).
Valerian, Greek (*see Polemonium cæruleum*).
Valerian, Long-spurred (*see Centranthus macrosiphon*).
Valerian, Red (*see Centranthus ruber*).

VALLARIS.

A small genus of twining stove shrubs (*ord.* Apocynaceæ), with white or whitish flowers, having salver shaped corollas ; leaves opposite. Propagated by cuttings in sand, in heat, covered with a bell-glass. Sandy loam and peat.

Principal Species :—

pergulana, twiner, wh. (*syn.* Pergularia).

VALLESIA.

A genus of stove shrubs or low trees (*ord.* Apocynaceæ), with small flowers. Propagated by cuttings, under a bell-glass, in sand, in heat. Peat and sandy loam.

Principal Species :—

cymbæfolia, 3′, My., wh. (*syn.* dichotoma).

VALLISNERIA. (Eel Grass, Tape Grass.)

A small genus of plants (*ord.* Hydrocharideæ), that named below, a half-hardy aquatic, being principally grown on account of the interesting way in which it is fertilised. The female flowers are elevated to the surface just previous to being ready for fertilising. The male flowers then part from the base and rise to the top of the water, on which they float. When the female blooms are thus fertilised, the stalk contracts in a spiral fashion, and lowers the ovary to the bottom to ripen and deposit the seeds. Propagated by division, or by seeds, and grown in deep tubs or cisterns. Minimum temperature, about 45°.

Only Species :—

spiralis, Jy., wh., small, lvs. grassy.

VALLOTA. (Scarborough Lily.)

Description.—A very effective and popular greenhouse bulbous plant (*ord.* Amaryllideæ), with showy scarlet flowers. It is a fine plant for the greenhouse, conservatory, or window.

Propagation.—By offsets.

Soil.—Sound, mellow loam, leaf soil, and sand, in about equal parts.

Other Cultural Points.—Pot firmly in June or July, just below the surface, the soil being only moderately moist at the time. The plants dislike frequent removal, and should not have the roots disturbed more than is absolutely necessary. A top-dressing of fresh soil, with occasional soakings of weak manure water, are very beneficial. The smaller offsets may be removed with a stick to avoid disturbing the main roots.

Only Species, its Varieties and Hybrid :—

hybrida, umbels of vermilion flowers ; hybrid (purpurea × Cyrtanthus sanguineus).
purpurea, 2′ to 3′, sum., red (*syn.* Amaryllis purpurea).
— eximia, throat wh., feathered crim.
— magnifica, flowers larger.
— major, reddish sc., anthers longer.
— minor, red, smaller.

VANCOUVERIA.

A genus consisting of two species of hardy perennial herbs (*ord.* Berberideæ). Propagated by division. Soil, rather moist, sandy peat. The following, though not a showy plant, is interesting and pretty.

Vallonea, Oak (*see Quercus Æg lops*).
Valoradia (*see Ceratostigma*).

Principal Species :—

hexandra, 9″, My., lil., wh. (*syn.* Epimedium hexandrum).

VANDA.

Description.—A large genus of Orchids (*ord.* Orchidaceæ) that includes many magnificent species. With very few exceptions, the plants have erect, leafy stems. Generally the leaves are gracefully recurved, long, leathery, and channelled. The flowers reach their largest size in the splendid sanderiana; they are borne in loose racemes, are bright hued, and usually fragrant.

Propagation.—By the removal of basal growths as soon as these have made a few roots; and by cutting the stems into pieces, each with some roots attached.

Soil.—A mixture of fibrous peat and sphagnum will suit all the Vandas, but in many gardens the roots are embedded in crocks, and over these a thick surfacing of living sphagnum is placed.

Other Cultural Points.—The same general conditions as advised for Aërides will suit most Vandas, but they love a little more shade when growing, and somewhat drier conditions when resting. Vanda teres is an exception; it loves abundant light, and should be grown unshaded, except when in flower. Syringe and water freely while growing, but after growth is complete give little water until the flower spikes appear.

Principal Species and Varieties :—

[NOTE.—s. = sepals, p. = petals, l. = lip.]

amesiana, 1¼′, early sum., s. and p. wh., blush, l. ro.
— alba, pure wh.
cærulea, 1½′ to 3′, aut., bl.
— fowleriana. large, rounded flowers, bl.
denisoniana, 1½′, sum., s. and p. wh., tinged grn., l. wh.
— hebraica. sulphur, marked dark sulphur.
hookeriana, 3′, aut., s. and p. wh., marked ro., l. wh., marked magenta, pur.
insignis (Blume), 3′, late win., s. and p. br., spotted chocolate, reverse yel., l. wh., marked ro.
— schröderiana, yel., wh.
kimballiana, 1½′, spr., s. and p. wh., l. rosy pur.
Parishii, 1′, sum., s. and p. greenish yel., spotted br., l. magenta, wh., vio., fragrant.
— marriottiana, s. and p. red and br., shading to ro., pur. and wh. at base; l. magenta pur., wh., not fragrant.
sanderiana, 3′, sum., dorsal s. and p. blush pk., stained buff yel., lower s. greenish yel., crim., l. crim. pur.
— albata, ground wh.
— labello-viride, l. grn.
suavis, 8′, aut., various, s. and p. wh., spotted pur., l. ro. pur., very fragrant (*syn.* tricolor of Hooker); the chief vars. are Chatsworth, much spotted; flava, ground yel.; Gottschalckei, extra fine; and rubra, or., br.
teres, 2′ to 6′, spr., s. wh., blush tinted, p. rosy magenta, l. or., marked red, central lobe ro. magenta; alba, aurorea, and candida are whiter vars.
tricolor, 4′ to 6′, various, s. and p. pale yellow, spotted reddish br., l. wh., magenta pur., marked br. Dalkeith, yel., pur.; Dodgsoni, very large, l. vio. pur.; insignis, yel., crim.; Patersoni, s. and p. wh., spotted br.; and planilabris, extra fine, s. and p. citron yel., are fine vars.

Only Artificial Hybrid :—

Miss Joaquim (teres × hookeriana), 3′, spr., early sum., s. and p. rosy pur., l. or., vio., rosy pur.

Other Species and Hybrids :—

Batemannii (now Stauropsis lissochiloides).
Bensoni, 1½′, spr., s. and p. yellowish grn., marked br., l. rosy pur., wh.
cærulescens, 1′, sum., s. and p. lil. bl., l. vio. bl.
Cathcartii (now Arachnanthe Cathcartii).
Charlesworthi, 2′, spr., s. and p. bl., veined pur., l. bl., pur., yel.; probably a natural hybrid (cærulea × Bensoni).
Clarkei (now Arachnanthe Clarkei).
concolor, 5′, sum., s. and p. yellowish br., l. wh., red, yel.
cristata, 2′, sum., s. and p. yellowish grn., l. pur., veined wh.
gigantea (now Stauropsis giganteus).
lamellata, 8″, win., s. and p. wh., br., l. pur.
— Boxallii, stronger, more distinctly marked.
limbata, 1½′, sum., s. and p. cinnamon br., edged yel., l. ro., wh.
Lowii (now Arachnanthe Lowii).
Moorei, 1¼′, aut., s. and p. light bl., l. pur.; probably a natural hybrid (kimballiana × cærulea).
multiflora (now Acampe longifolia).
Roxburghii, 1½′, sum., s. and p. grn., veined br., l. vio. pur., wh.
schröderiana (*see* insignis var.).
tricolor of Hooker (*see* suavis).
undulata (now Stauropsis undulatus).

VANDELLIA.

Annuals (*ord.* Scrophularineæ), requiring warm greenhouse treatment. Propagation, by seeds in spring, in loam and leaf mould, over gentle bottom heat. Prick off the seedlings as necessary, and pot in a light, rich compost.

Principal Species :—

crustacea, 1′, Je., bl. (*syn.* Hornemannia ovata).
diffusa, 1′, Jy., wh.
hirsuta, 1′, Je., bl. (*syn.* Hornemannia viscosa).
pedunculata, 1′, Jy., pur. (*syn.* Roxburghii).

VANESSA.

A genus of very handsome butterflies, and one that seldom gives either farmer, forester, or gardener any trouble. Such popular and beautiful species as the Red Admiral (Atalanta), Peacock (Io), and the Small Tortoiseshell (Urticæ), feed on Nettles, and consequently deserve encouragement rather than destruction. A species that was once common in London—the Camberwell Beauty (Antiopa)—is now rarely found in this country; it feeds on Willows, and is sometimes caught in the Fen districts. The Small Tortoiseshell is one of the first butterflies to appear in the spring.

VANGUERIA.

Stove evergreen shrubs (*ord.* Rubiaceæ). Propagation, by cuttings of half-ripened growths, in sand, beneath a bell-glass, over bottom heat. Soil, fibrous peat and sandy loam, in equal parts.

Principal Species :—

edulis, 10′, Je., greenish wh. The Voa-Vanga of Madagascar; a dessert fruit of good quality.

VANILLA.

Strong growing plants (*ord.* Orchidaceæ) that climb by means of their clinging roots and twining stems. They require abundance of heat and moisture, and should be allowed Larch poles or Teak rods to climb up. Peat and sphagnum provide a suitable medium for the basal roots. Propagation is by division of the stems.

Vapourer Moth (*see Moths and Orgyia*).
Varennea (*see Eysenhardtia*).
Variegated Laurel (*see Aucuba*).
Vauxa (*see Rafnia*).
Vasconcella (*see Carica*).

Principal Species :—

africana, 10′, sum., wh.
aromatica, 12′, sum., wh.
Phalænopsis, 10′, sum., wh., lip blush, yel.
planifolia, 20′, sum., greenish wh. The fruit of this is the vanilla of commerce.

VASES.

The proper arrangement of cut flowers in the dwelling room and upon the dinner table necessitates a supply of various makes and sizes of vases. There are innumerable artistic designs now available at reasonable prices, and even the most exacting of flower arrangers may find something to suit his or her individual taste.

China and glass are both utilised, and glass vases especially can be had in all manner of tints and shades. On the whole, clear glass receptacles are the most useful, as flowers of any colour can be placed in them without fear of clashing. Coloured glass, on the other hand, may be, and is, employed with excellent effect in many cases, but where a decided tone is adopted the number of flowers that it is possible to use is considerably reduced. This association of colours is one of the most important branches of the floral artist's work.

With regard to size, the decoration of a large dinner table will call for a number of receptacles varying in size from the tall trumpet shaped vases or épergnes in the middle to the smaller specimen glasses which stand immediately before the guests, and which are meant to take only a single Rose or Carnation with its accompanying greenery. Whether large or small, the vases should have a sufficiently long, hollow stem to hold the flowers securely. Many otherwise excellent patterns are lacking in this respect, and their value as cut flower holders is severely discounted thereby.

For room decoration heavier and more massive vases are required, to fill corners and to stand upon sideboards or special stands. In these it is permissible to use much bigger flowers, and such a vase, filled with Chrysanthemums for instance, may be made to look very effective. The material generally chosen is china, and both the trumpet and urn shaped patterns, with others intermediate in character, are to be had. In all cases it is a most important point that the weight of the vase should be in proportion to the flowers it is expected to hold, or the equilibrium of the former will be seriously imperilled.

In the flower garden vases for living plants play a great part. Some amount of taste is necessary in apportioning them, for it is easy to have too many. Also a vase that would be quite suitable in the front garden of a London suburban villa would be ridiculous in a larger and more pretentious garden, and *vice versâ*. Here, too, the height of the occupants must be strictly proportioned to the size of the vase. When all these items are taken into consideration the flower garden stands to gain considerably by the inclusion of vases. The most expensive ones are made of stone, or of brickwork cemented over, and in some instances the value and expense are increased by more or less elaborate carving. Of these larger vases and the part they play perhaps no better instances can be adduced than those in Regent's Park, which, with their complement of Palms, Abutilons, Dracænas, and Castor Oil Plants among the taller subjects, finished off round the edges with such trailers as Campanula isophylla, C. i. alba, Ivy-leaved Geraniums, Mimulus moschatus Harrisonii, and the variegated Nepeta, are invariably one of the features of the bedding. In the flower gardens attached to the larger private estates, the terrace surrounding the mansion is a capital place for vases with low pedestals. Stonework is generally favoured in such cases. Larger vases may be fixed at the intersection of walks, or at the ends of short vistas, and these should always be mounted upon tall pedestals and filled with plants which attain to a good height, otherwise the effect is insignificant.

Vases of ordinary potware are in vogue, but the receptacles of these are frequently so shallow that only dwarf plants can be put in them. Also the ware is liable to chip if exposed to sharp frost. It is advisable, therefore, to remove these vases to cover in the autumn. Stone receptacles stand the weather much better, and thus, after the summer occupants have gone, they may be filled with dwarf growing shrubs for the winter months. Neither stone nor ware vases should have the green moss washed from them. It usually appears after a season or two, and helps to tone down the newness and garishness of the receptacles.

For small gardens rustic vases are to be preferred to all others. Individual ingenuity and taste will easily construct them out of small tubs covered with rough bark or sheets of virgin cork. Small margarine or butter tubs are excellent. The legs should be of rough, unbarked wood. Painted tubs are occasionally seen, but unless the colour is a dark green, to tone with the surrounding grass and shrubs, the effect is not good.

Fresh soil and drainage should be put in once a year, and practically any of the common summer bedding plants may be utilised.

VEGETABLE MARROW.

The Vegetable Marrow is high in favour as a cottagers' vegetable. Usually the fruits are eaten whilst young and tender; if the skin is too hard to allow the entry of the thumb-nail it is considered too old. Ripe Marrows make an excellent preserve.

The plants are very easy to grow, and the only difficulty experienced by the cottager is to get early plants. The best results are obtained by planting out of doors in prepared stations by the end of May. To do this, seed must be sown in heat early in April. One plump seed may be placed in a thumb pot, broad or wedge end downwards, and as soon as the seedlings appear they may be potted into 4½″ pots. Or the seed may be placed straight away in the 4½″ pot and subsequent potting avoided. Let the soil be good loam three parts, and leaf mould one part, with one-eighth sharp sand. Do not make the soil very firm. If a place in a warm house cannot be obtained, a cold frame kept close, or even a corner in the window of a sunny dwelling room, may be made to serve, but the plants will be later.

The stations should be prepared fully a couple of months prior to planting, as although the Marrow is a deep feeder it is advisable not to bring the roots of the young plants into close contact with rank manure. Dig out holes 1 yard square and 1′ deep, place in the bottom 6″ of good farmyard manure, return the soil to its place, and plant on the top of the mound. Old Violet beds come in capitally for Marrows, and the frames may be kept on for a little while after planting in case of frost.

It is always advisable to have covering material at hand for two or three weeks after planting out,

for two or three degrees of frost would cripple the plants. The careful cultivator who has Cauliflower hand-lights to spare utilises them for his Marrows.

The points should be taken out of the plants after they have begun to grow freely; this will facilitate the formation of side shoots. The usual method of training is to distribute these shoots evenly over the ground, but the plants may also be trained with advantage up wooden or wire trellises. No artificial pollination is necessary.

In periods of drought it will often be found that the fruit will not set. Copious supplies of water at the roots and overhead will help to ensure setting. Also keep all Marrows cut as they become large enough, except where one is wanted for seed. Liquid manure may be given freely. Nitrate of soda, ½ oz. per square yard, is an excellent fertiliser; so also is a little guano dissolved in clear water. Soot water is a capital variant.

Mildew occasionally attacks the plants in the autumn, but it does not appear to do them much damage. If black fly appears in the earlier stages, dust with tobacco powder, and wash off two hours after with clear water.

The following are excellent varieties.

Custard.	Moore's Cream.
*Long Green.	Pen-y-byd.
*Long White.	

* Select one of these where one variety only is wanted.

VEINS.

Upon reaching the leaves the strands of fibro-vascular tissue split up and branch more or less, until at the margins of the leaves they resolve themselves into very fine threads, which are, however, distinctly visible amidst the surrounding tissue. Thus are originated the veins or nerves of the leaves.

Broadly speaking, two systems of arrangement are to be seen, (1) in which the nerves are approximately parallel to each other, and (2) in which they appear to branch indiscriminately and run into each other so as to form a network, the ultimate ends of the veinlets occurring within the areas enclosed by the stronger veins. The former type is characteristic of Monocotyledons generally, and is well seen in the leaves of the Lily of the Valley. The latter type is the Dicotyledonous one, and is exemplified in most of our common flowering plants, *e.g.* the Primrose, the Oak, and the Horse Chestnut.

From a garden point of view, many foliage plants owe much of the beauty of their leaves to the nerves or veins. Where variegation is a feature this is usually most strongly marked in the immediate vicinity of the veins, as well as in the veins themselves. Or the nerves may be delicately tinted with a colour distinct from that displayed by the rest of the leaf. This is well seen in many Caladiums, where the veining is often the greatest beauty of the leaf.

In skeletonising leaves the operator attempts to sever the nerve system from the surrounding tissue and to keep the former intact. The leaves are either allowed to rot in water or are boiled in a solution of potassium permanganate, or lime and soda mixed. After the ground tissue has been destroyed the veins are bleached with chloride of lime, two dessert spoonfuls in 1 gallon of water. Leaves which are to be skeletonised should be gathered at their prime.

VEITCHIA.

Handsome stove Palms, closely allied to and needing somewhat the same conditions as Kentias. They will not, however, stand the rough usage that Kentias will. Propagation is by imported seeds, in heat. The principal species are Johannis and Storckii; the latter attains a height of 40′.

VELLA. (Cress Rocket.)

Half-hardy evergreen shrubs (*ord.* Cruciferæ). Propagation, by cuttings of young growths in summer, beneath a hand-light, and kept shaded. Soil, loam, leaf mould, and sand.

Principal Species :—

Pseudo-cytisus, 3′, Ap. and My., spur yel.

VELLEIA (*syn.* Velleja).

Dwarf growing greenhouse evergreen herbs (*ord.* Goodenovieæ). Propagation, by division. Soil, fibrous loam and sandy peat.

Principal Species :—

lyrata, 6″, Ap., yel.
macrophylla, 3′, My., yel.
paradoxa, 6″, Jy., yel.
spathulata, 6″, Ap., yel.

VELLOZIA.

Tall growing, much branched, stove or warm greenhouse perennials (*ord.* Amaryllideæ). Propagation, by division in spring. Soil, loam and peat in equal proportions, with a little leaf mould and coarse sand.

Principal Species :—

candida, 3′, sum., wh.
elegans, 3′, various, wh., grn.
retinervis, 3′ to 10′, sum., bl.

VELTHEIMIA.

Greenhouse bulbous plants (*ord.* Liliaceæ). Propagation, by offsets. Soil, light loam, with plenty of sand. Viridifolia is a popular window plant.

Principal Species and Variety :—

glauca, 2′, Mch., flesh.
— rubescens, deeper colour.
intermedia, 1½′, Ap., flesh.
viridifolia, 2½′, Aug., flesh (*syn.* Aletris capensis).

VENIDIUM.

A genus of hardy, half-hardy, or greenhouse annual and perennial herbs (*ord.* Compositæ), with rather large and showy flowers. They make good pot plants, or may be used for summer bedding. They may be treated as annuals, and propagated by seeds sown in heat in spring or by cuttings in summer or autumn. Soil, loam and leaf mould or peat.

Principal Species and Variety :—

calendulaceum (*see* fugax).
decurrens var. calendulaceum, 6″ to 12″, Jy., grh. per., yel., br. (*syn.* calendulaceum of Less., not of gardens).
fugax, 1½′, Jy., hdy. ann., or., blk. (*syn.* calendulaceum of gardens).
hirsutum, 9″ to 12″, Jy., hdy. ann., or., blk. rather paler than above (*syn.* speciosum of gardens).

VENTILAGO.

A small genus of climbing stove shrubs (*ord.* Rhamneæ), with panicles of small flowers and alternate leaves. Propagation, by division, and by seeds and cuttings in heat. Soil, loam, peat, and sand.

Principal Species :—

madraspatana, cl., Je., grn.

Venice Sumach (*see Rhus Cotinus*).
Ventenatia minor (*Stylidium linearе*).

VENTILATION.

Proper ventilation is one of the most important factors in the cultivation of plants under glass, and to secure it will well repay care and study. Structures differ very much, and the amount of ventilation required depends largely upon their situation, and their condition as to the admission of air at the various openings and between the laps of the glass. Draughts must always be avoided, and it is thus desirable that, wherever possible, the building should have ventilation so provided that the openings on the side away from strong winds may be in use, while those on which the wind would impinge are closed. Ventilation ought to be given before the houses become overheated, when the sudden admission of cold air would be injurious. It is also desirable that the ventilators should be so arranged that they can be opened and closed easily and quickly, or left open to any extent required. This can be readily secured by the use of several of the appliances made for the purpose of working the ventilators. Ventilation is one of the most effectual means of keeping down insect pests, and due attention at the proper time will avoid much future trouble.

VENUS' FLY-TRAP (*see* DIONÆA MUSCIPULA).

VERATRUM. (FALSE HELLEBORE.)

A genus of hardy perennial herbs (*ord.* Liliaceæ), ornamental in spring because of their young leaves, and decorative when in flower, though the blooms are not showy. From album is produced the Hellebore which is used to destroy caterpillars. The plants are propagated by division or seeds, and prefer a strong, rich soil. They are not very striking when grown in poor dry soil.

Principal Species and Varieties :—

album, 3′ to 4′, Jy., whitish, grn.
— lobelianum, greenish.
— viride (*see* viride).
Maackii, 2′, sum., dark pur.
nigrum, 3′, sum., blackish pur.
viride, 3′ to 4′, Jy., greenish (*syns.* album var. viride and Helonias viridis).

VERBASCUM. (MULLEIN.)

An extensive genus of biennial or perennial herbs or sub-shrubs (*ord.* Scrophularineæ), of which only a small number are ornamental enough to be cultivated. Propagation, by seeds in the case of all the species; the perennials, such as phœniceum, Chaixii, nigrum, and cupreum, by division also, and the sub-shrubs by cuttings. Any common soil will do.

Principal Species, Hybrid, and Varieties :—

Chaixii, 3′, sum., hdy. per., yel. Nettle-leaved Mullein.
crassifolium, 3′, sum., bien., yel.
cupreum, 3′, sum., per., copper yel., hybrid (ovalifolium × phœniceum).
nigrum, 2′ to 3′, sum., per., yel. Dark Mullein.
— album, wh.
olympicum, 6′, sum., hdy. bien., yel.
phœniceum, 3′, sum., per., vio., red (*syn.* ferrugineum of Andrews).
— vars. from wh. to pur.

Venus' Hair (*see Adiantum Capillus-Veneris*).
Venus' Looking-glass (*see Specularia Speculum*).
Venus' Navelwort (*see Omphalodes*).
Venus' Petticoat (*see Rhodochiton volubile*)
Venus' Sumach (*see Rhus Cotinus*)
Vepris (*see Toddalia*).

Other Species and Varieties :—

Blattaria, 9″ to 48″, sum., bien., yel. Moth Mullein.
Boerhavii, 2′, sum., ann. or bien., yel.
ferrugineum (*see* phœniceum).
floccosum (*see* pulverulentum).
longifolium, 4′, Jy., bien., yel.
— pannosum, 4′, Jy., yel., lvs. tomentose (*syn.* V. pannosum).
ovalifolium, 1′, sum., bien., or.
pannosum (*see* longifolium var.).
phlomoides, 3′, sum., bien., yel. Woolly Mullein.
pinnatifidum, 1′, sum., sub-shr., yel. (*syn.* bipinnatifidum).
pulverulentum, 3′ to 7′, sum., bien., yel. (*syn.* floccosum).
pyramidatum, 3′ to 6′, sum., bien., yel.
rubiginosum, 2′, sum., bien., yel., red.
— tauricum, larger.
speciosum, 6′, sum., bien., yel.
spectabile, 2′, sum., bien., yel., pur.
Thapsus, 2′ to 6′, sum., bien., yel. Aaron's Rod, Cow's Lungwort, Hag or Hig Taper, Jacob's Staff, etc.
wiedemannianum, 1′ to 3′, sum., bien., bl. to lil.

VERBENA. (VERVAIN.)

Description.—A large genus of greenhouse or hardy herbs and sub-shrubs of annual or perennial habit (*ord.* Verbenaceæ), of which comparatively few species are in cultivation, on account of the greater favour shown to the garden varieties. Venosa is almost hardy, and can be grown with little protection. Officinalis was formerly used for medicinal purposes.

Propagation.—By seeds, sown in spring in heat, or by cuttings of the young growths; the hardy perennials also by division.

Soil.—Rich loam, well manured.

Principal Species and Varieties :

[NOTE.—All are perennial except where otherwise stated.]

Aubletia, 6″ to 12″, sum., hdy. bien., reddish pur., lil. Rose Vervain.
—Lambertii, lvs. narrower.
— rosea, paler.
chamædrifolia, sum., hlf-hdy. creeping sub-shr., sc. (*syn.* melissoides).
— Melindres, lvs. less hairy, sc. (*syn.* Melindres).
officinalis, 1′ to 2′, sum., hdy., lil. (*syn.* sororia).
Common Vervain, Simpler's Joy, Holy Herd, etc.
stricta, 1′ to 2′, sum., hdy., bl.
sulphurea, 2′, sum., grh. sub-shr., sulphur yel.
teucrioides, 2′, sum., grh. sub-shr., pk. or wh.
triphylla (now Lippia citriodora).
venosa, 2′, sum., hlf-hdy., lil. or bl.

Other Species and Varieties :—

alata, 4′, sum., hlf-hdy., ro.
amœna, 1′, sum., hlf-hdy., pur.
bracteata, sum., hdy. ann., decumbent, pur., bl.
elegans, sum., hdy. ann., procumbent, bl.
erinoides, sum., hdy. ann., decumbent, reddish vio. (*syn.* multifida).
— contracta, (*syns.* multifida contracta and erinoides Sabini).
hastata, 3′ to 6′, sum., hdy. per., bl. Wild Hyssop, Blue Vervain, Simpler's Joy.
— paniculata, none of the lower lvs. three lobed.
mutabilis (now Stachytarpheta mutabilis).
phlogiflora, 1½′, sum., grh. sub-shr., pur., lil., red, or bl.
— vulgaris, decumbent (*syn.* tweediana).
radicans, sum., grh. sub-shr., procumbent, lil.
tenera, sum., grh. sub-shr., vio. (*syn.* pulchella).
— Mahonetti, reddish vio., margined wh.
trifida, 3′, sum., grh. shr.
xutha, 2′ to 3′, sum., hlf-hdy., pur. or bl.

The hybrid Verbenas are very attractive and useful, either for bedding or for growing in pots. Named varieties are not now much cultivated, as

seedlings are more vigorous and healthy. The strains of seed are now greatly improved, and some can be depended on to come almost true from seeds. One of the newest named varieties is Miss Willmott, but it seems needless to name others in view of the diversity secured from mixed seeds.

VERBENA, LEMON-SCENTED

(*see* LIPPIA CITRIODORA).

VERBESINA. (CROWN BEARD.)

A genus comprising a considerable number of stove, greenhouse, or hardy annuals and perennials (*ord.* Compositæ), which are of little horticultural merit. Pinnatifida and mameana have ornamental leaves. Propagated by seeds; the perennials also by division. Soil, rich loam, with leaf soil or peat.

Principal Species :—

alata, 2″, Aug., st. per., yel.
Coreopsis (now Actinomeris squarrosa).
crocata, 2′, sum., st. per., or. yel.
encelioides, 3′, Aug., grh. ann., yel.
gigantea, sum., hlf-hdy., used young for bedding.
mameana, 6′, lvs. large, handsome.
occidentalis, 3′, Jy., hdy. per., yel. (*syn.* Actinomeris alata).
pinnatifida, 3′, Aug., grh. per., pale yel.
virginica, 2′, Aug., hdy. per., wh.

VERGE CUTTER.

The name of various appliances used for cutting the margins of grass paths and beds in grass. A common one is also known as an edging-iron—a tool with blade of almost half-moon shape. There are, however, others which do good work and are more speedy, which are mounted on wheels, cutting the verges as they are pushed along. While trim, smooth verges are to be desired, the operation ought not to be too frequently performed, as it removes a portion of the turf each time, and thus reduces it.

Vereia (*see Kalanchoë*).
Vernal Grass, Sweet-scented (*see Anthoxanthum odoratum*).

VERNONIA (IRONWEED).

A most extensive genus (*ord.* Compositæ), embracing 300 or 400 hardy, greenhouse, or stove perennial or annual herbs and shrubs, a few being conspicuous plants in the border in autumn. Propagated by division. Common soil.

Principal Species :—

altissima, 5′, aut., hdy. per., pur. vio. (*syn.* prælta).
arkansana, 4′, aut., hdy. per., pur.
— alba, wh.
calvoana, 8′ to 12′, Jan., st. shr., wh.
Cotoneaster, 1½′, Sep., st., pur. (*syn.* axilliflora).
flexuosa, 1½′, Sep., st. per., pur., or., wh.
noveboracensis, 5′, Aug., hdy. per., pur.
pinifolia, 2′, sum., grh. per., pur. (*syn.* Webbia pinifolia).
podocoma, 6′, grh., pur.
scorpioides, 1′, sum., st. shr. (*syn.* centriflora).
sericea, 4′, Dec., st. sub-shr., pur. or wh.

VERONICA MONTICOLA (*see p.* 426).

VERONICA.

A large genus of hardy or greenhouse herbs, sub-shrubs, or shrubs (*ord.* Scrophularineæ), frequently of much beauty in the garden or shrubbery. They are propagated by seeds, the shrubs also by cuttings, and the herbaceous plants by division. The hardiness of many of the shrubby species in gardens is rather doubtful, and it is well to keep a reserve stock in a frame. Syriaca and its variety alba are pretty annuals for spring or summer bloom.

Principal Species and Varieties :—

Hardy Herbaceous :—

corymbosa, 6″ to 9″, aut., bl. A pretty Alpine.
gentianoides, 6′ to 12″, Je., bl.
— alba, wh.
— variegata, lvs. variegated.
incana, 1½′, Jy., bl. (*syn.* neglecta of Sweet).
longifolia, 2′, Aug., lil.
— subsessilis, 2′ to 4′, Aug., bl.; very fine.
orientalis, 1′, Jy., flesh.
repens, 2″, sum., wh.
rupestris (*see* Teucrium dubia).
spicata, 6″ to 18″, Jy., bl., variable. Good vars. are alba, wh.: corymbiflora and hybrida, various.
Teucrium, Jy., decumbent, bl.
— dubia, lvs. smaller, bright bl. (*syns.* prostrata and rupestris).
virginica, 2′ to 6′, Jy., wh. or bl. (*syn.* Leptandra virginica). Culvers' Physic, Great Virginian Speedwell.

Shrubs or Sub-Shrubs :—

Andersonii, 1½′ to 3′, Jy., hybrid, hlf-hdy.
— variegata.
Bidwillii, sum., dwarf, hdy., prostrate, wh., vio., or pk.
cupressoides, 6″ to 36″, sum., hdy., vio., Heath-like (*syn.* salicornioides of gardens).
— variabilis, dwarfer.
decumbens, sum., hdy., decumbent, wh.
elliptica, 3′ to 20′, Jy., hlf-hdy., wh. (*syns.* decussata and Menziesii).
glauco-cœrulea, 1½′, sum., hdy., decumbent.
Hectori, 6″ to 24″, sum., lil. ; very pretty.
Lewisii, 3′ to 6′, sum., hdy. or hlf-hdy., bl., wh., or pur.
Lyallii, 1′, sum., hdy., prostrate, wh.
pinguifolia, 2′, sum., hdy., wh.
salicifolia, 2′ to 6′, sum., hdy., wh. Also var. gracilis.
saxatilis, 2″ to 6″, Jy., hdy., bl. Rock Speedwell.
— alba, wh.
— balfouriana, deep bl.
— rosea, pk.
speciosa, 1½′ to 4′, My., hlf-hdy., bluish pur. (*see* garden vars.).
Traversii, 2′ to 6′, sum., wh.; one of the hardiest.

Other Species and Varieties :—

Herbs (*hardy unless otherwise indicated*) *:—*

alpina, 6″ to 12″, My., bl. or vio.
— Wormskioldii, pubescent.
aphylla, 3″, My., bl.
austriaca, 1′, Jy., bl.
Beccabunga, 6″ to 24″, sum., bl., wh. Brooklime.
bellidioides, 6″, My., bl.
Buxbaumii, 6″ to 12″, My., etc., prostrate ann., bl.
canescens, 2″, sum., hdy. or hlf-hdy., pale bl.
caucasica, 1′, Je., pk.
Chamædrys, 8″ to 24″, My., bl. Germander Speedwell, Angel's Eyes, Bird's Eyes, God's Eye.
incisa, 2′, Jy., bl.
monticola, 1′, sum., trailer, bl. (*s e p.* 425).
multifida, 6″, Je., diffuse, pale bl.
neglecta (*see* incana).
Nummularia, 6″, sum., creeping, bl. or pk.
officinalis, 3″ to 6″, My. etc., bl. or lil. Common Tea Speedwell, Fluellen, Ground-hele.
orchidea, 6″ to 12″, Jy., bl.
paniculata (*see* spuria).
pectinata, My., prostrate, bl.
— rosea, pk.
pinnata, 4″ to 24″, Je., bl.
prostrata, 6″, sum., trailing, bl.
satureioides, 3″, My., bl.
spuria, 1′ to 3′, Je., bl. (*syn.* paniculata).
syriaca, 6″, Je., ann., bl.
— alba, wh.
telephiifolia, 6″, sum., per., bl.

Shrubs or Sub-Shrubs :—

amplexicaulis, 1′ to 2′, sum., hdy. or hlf-hdy., wh.
anomala, 3′ to 6′, sum., hdy., wh.
Armstrongii, 1′ to 3′, sum., hdy. or hlf-hdy., wh.
balfouriana, 1′ to 1½′, sum., hdy., pur.
buxifolia, 2′ to 3′, sum., hdy., wh.
carnosula of gardens (*see* pinguifolia).
Catarractæ, 9″ to 24″, sum., hdy. or hlf-hdy., wh. or pk.
chathamica, sum., hdy. or hlf-hdy., prostrate, pur.
Colensoi, 1′ to 2′, sum., hlf-hdy., wh., bl., or pk.
decussata (*see* elliptica).
Derwentia, 2′ to 3′, Je., pale bl. or wh.
Dieffenbachii, 2′, sum., grh., bl.
diosmifolia, 3′ to 12′, Jy., grh., wh.
— trisepala, sepals large, two frequently joined.
epacridea, sum., hlf-hdy., wh.
Fairfieldii, 1′ to 3′, sum., hlf-hdy., lil. ; hybrid.
formosa, 2′ to 4′, Jy., grh., bl.
fruticulosa, 6′, Jy., hdy. sub-shrub, bl. or pk.
Godefroyæ, 1½′ to 3′, sum., hdy., supposed to be carnosula of Hook. *Handbook of New Zealand Flora.*
Grievei, 6″, sum., hdy., pk.
guthrieana, 6″, sum., hdy., bl.
hulkeana, 1′ to 3′, sum., hlf-hdy., lil.
Kirkii, 6′ to 12′, sum., hlf-hdy., wh.
lævis, 2′ to 4′, sum., hlf-hdy., wh.
lavaudiana, 8″, sum., grh., decumbent, pur.
lindleyana (*see* salicifolia var.).
Lindsayi, 1′, sum., hdy. or hlf-hdy., pk., hybrid.
loganioides, 6″, sum., hdy., wh., striped pk.
lycopodioides, 1′ to 3′, sum., hdy. or hlf-hdy., wh.
parviflora, 4′ to 6′, My., hlf-hdy., bl.
— angustifolia, lvs. narrower.
pimeleoides, 6″ to 12″, sum., grh., pur.
rakaiensis, 3′ to 6′, sum., hdy. or hlf-hdy., wh. (*syn.* Colensoi gracilis).
salicornoides of gardens (*see* cupressoides).
vernicosa, 1′, sum., hdy. or hlf-hdy.

There are a number of other shrubby species, forms, and garden hybrids.

Selection of Tender Garden Varieties :—

Arc-en-Ciel, red, lvs. variegated.
Blue Gem, dark bl.
Eclatante, red.
Étoile Blanche (White Star), lvs. variegated.
La Séduisante, pur.
Purple Queen, pur. vio.

VERSCHAFFELTIA.

A monotypic genus (*ord.* Palmæ) consisting of the undernoted, an ornamental stove Palm, with fine, broad leaves. Propagation, by seeds sown in a hotbed or in bottom heat in a house. Soil, fibrous loam, with about a quarter of thoroughly decayed cow manure.

Only Species :—

melanochætes (now Roscheria melanochætes). long, 3′ to 5′ broad, bright grn. (*syn.* splendida, 80′, spadix 3′ to 6′ long, lvs. 4′ to 7′ Regelia magnifica, R. majestica, and R. princeps of gardens).

VERTICORDIA.

A genus of Heath-like greenhouse shrubs (*ord.* Myrtaceæ), with small but pretty flowers and leaves. Propagated by cuttings of nearly ripe shoots in sandy soil under a glass. Soil, loam and leaf mould, with a little sand. Abundant but careful watering and syringing are needed.

Principal Species :—

acerosa, 2′, Ap., yel.
Brownii, 3′, Ap., wh.
densiflora, 2′, Je., wh. or pk.
Fontanesii, 3′, Ap., wh.
(*syn.* Chamælaucium plumosum).
insignis, 1′, Ap., pk.
nitens, 2′, Ap., yel. (*syn.* Chrysorrhoë nitens).

VESICARIA. (Bladder Pod.)

A genus of upwards of thirty species of yellow flowered hardy perennial or annual herbs (*ord.* Cruciferæ), suitable for rockwork or the front of the border, and interesting from their bladder-like seed pods. They are propagated by seeds; the perennials also by division. Common soil.

Principal Species :—

arctica, 1′, Aug., per.
gracilis, 6″, Je., ann.
græca, 1′, sum., per.
grandiflora, 1′, Jy., ann.
utriculata, 1′, Ap. per. (*syn.* Alyssum utriculatum). One of the best.

VESSELS AND VASCULAR SYSTEM.

In dealing with the morphology of plants the cell is taken as the unit from which all the organs are formed. The vessel is really an elongated cell, usually formed by the superposition of several cells and the absorption of the partitions or transverse cell walls. The vessels may be divided into

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Versailles Laurel (*see Prunus Laurocerasus latifolia*).
Verrain (*see Verbena*).
Verrain, Bastard (*see Stachytarpheta*).
Vespuccia (*Limnocharis Humboldtii, correctly Hydrocleis Commersonii*).

two classes, viz. true vessels and ground tissue vessels. The true vessels may be subdivided into (1) those of the wood (xylem) and (2) those of the bast (phloem). They are associated in the fibro-vascular tissue of the stems and leaves both of Monocotyledons and Dicotyledons.

First taking the vessels of the wood, it will be found that they can be conveniently classified, according to the thickening of the walls, into spiral, annular, reticulated, and scalariform. The spiral and annular vessels have a spiral thickening, which may be likened to a spiral coil of wire enclosed in a glass tube. In the annular vessels the coils of the spiral are very close. The reticulated vessels have the thickening disposed in network fashion, while the scalariform ones show the thickenings on their walls to be arranged to resemble the rungs of a ladder. At first filled with protoplasm, the vessels of the wood soon lose this, and in their later stages are only filled with air, or air and sap at certain times of the year. The wood cells or wood fibres seen in company with these vessels are long, very narrow tubes, with lignified walls and tapering and overlapping ends; their function is to impart strength and rigidity. Sometimes their walls are pitted like those of the vessels, but their transverse walls are not absorbed; in this state they are known as tracheides, as apart from the true tracheæ or vessels.

The vessels of the bast (phloem) appear as thin and very slender ducts with thin and not at all rigid walls, the transverse partitions being only partly absorbed. These partly absorbed walls are, however, perforated in various places, the perforated partitions being known as "sieve plates," and the vessels themselves as "sieve tubes." These vessels of the bast are filled with protoplasmic or mucilaginous contents. Bast fibres resemble the wood fibres in shape and disposition, but they have not lignified walls, and their functions are to give toughness and elasticity rather than rigidity.

The vessels of the ground tissue are chiefly represented by the lactiferous receptacles to be found in plants belonging to such natural orders as Papaveraceæ, Euphorbiaceæ, and Asclepiadeæ. They may originate, not by the union of cells, but by the growth and branching of a single cell. It has been suggested that they may even be intercellular spaces into which the latex has been forced. In a work of this scope it is impossible to go into detail, and the reader is recommended to some of the excellent works upon morphological botany which exist.

The vascular or fibro-vascular system of plants is composed of bundles made up of the vessels referred to in combination with their accompanying tracheides and companion cells and, in the Dicotyledons, the all-important layer of cambium which lies between the xylem and phloem. That is as far as the stem is concerned. In the root the xylem and phloem are dissociated and alternate with each other, instead of the one lying behind the other. The cambium is here represented by the pericambium which encloses the central axis formed by these strands of xylem and phloem.

Again referring to the stem, a different arrangement of the bundles prevails in Monocotyledons from that seen in Dicotyledons. In the latter the bundles are "open" or "indefinite," and possessing, as they do, a cambium layer, growth is only limited by the life of the tree. In the fibro-vascular bundles of Monocotyledons there is no cambium layer, the bundles are said to be "closed" or "definite," and little increase in size of the stem takes place.

In all flowering plants the bundles pass from the stem into the leaves, and hence are known as "common" bundles. In the higher Cryptogams there are "cauline" bundles, which only branch into the leaves.

All plants possessing a vascular system are styled vascular plants.

VESTIA. (Chilian Box-thorn).

An interesting greenhouse shrub (*ord.* Solanaceæ), propagated by cuttings of half-ripe shoots under a glass in sand, and thriving in loam and peat with a little sand.

Only Species:—

lycioides, 3', Je., yel.

VIBURNUM. (Guelder Rose.)

A large genus (*ord.* Caprifoliaceæ) of deciduous or evergreen shrubs or trees, principally hardy, of easy cultivation, and many very ornamental in the shrubbery or garden. Propagation, by layers or by cuttings of half-ripe shoots in sandy soil, under hand-lights. Common soil. Viburnums are prized for forcing to flower in winter and early spring. Take from the open ground in October, pot, and plunge them in the open or in a cold frame until wanted to be brought into heat from December onwards. For this purpose the greater number are valuable—Tinus, the common Lauristinus, being very suitable. Opulus is one of the most ornamental of our native shrubs, with its large flower heads followed by bunches of pinkish berries. Opulus sterile is one of the most popular and effective shrubs, with its large, globular heads of white flowers in profusion. Lantana, the Wayfaring Tree, is a good hedge plant.

Principal Species and Varieties:—

cassinoides, 6'', Je., yel., wh. (*syns.* nudum cassinoides and squamatum).
dentatum, 5' to 10', Je., bl. or pur. American Arrow Wood.
— variegatum, lvs. variegated.
dilatatum, 10', Je., wh.
macrocephalum, 20', Je., wh. (*syn.* Fortunei of gardens).
odoratissimum, 6' to 10', My., wh., ev., fragrant.
Opulus, 6' to 8', Je., wh. (*syns.* edule and Oxycoccus). Guelder Rose, Snowball Tree, Cranberry Tree, etc.
— foliis-variegatis, lvs. wh., yel.
— nanum, about 1' high.
— sterile, all the flowers sterile, the best. Garden Guelder Rose or Snowball Tree.
prunifolium, 6' to 12', My., wh. (*syn.* pirifolium). American Black Haw.
Tinus, 8' to 10', Dec. to Mch., ev., wh., ro. Laurustinus.
— Frœbeli, whiter, lvs. lighter.
— hirtum, blooms in aut. and win., lvs. hairy below.
— lucidum, larger than type. There is also a variegated form.
— purpureum, lvs. purplish.
— rotundifolium, lvs. round.
— strictum, rather upright in habit.
— strictum variegatum, lvs. variegated.
— variegatum, lvs. variegated wh.
tomentosum, 4' to 6', My., wh. (*syn.* plicatum of Siebold and Zuccarini).
— plicatum, 4' to 6', My., wh., sterile flowers.

Vetch (*see Vicia*).
Vetch, Bastard or Bladder (*see Phaca*).
Vetch, Bitter (*see Orobus*).
Vetch, Chickling (*see Lathyrus sativus*).
Vetch, Crown (*see Coronilla*).
Vetch, Liquorice (*Astragalus glyciphyllus*).
Vetch, Medick (*see Onobrychis*).
Vetch, Milk (*see Astragalus*).

Other Species, Hybrids, and Varieties :—

acerifolium, 3′ to 6′, My., wh. Dockmackie.
cotinifolium, 5′ to 10′, Je., wh. Indian Wayfaring Tree.
davuricum, 3′, Je., wh.
edule (*see* Opulus).
erosum, flowers in a hairy umbel.
Fortunei (*see* macrocephalum).
furcatum, 12′, grown for sc. or pur. aut. tints.
Keteleeri (*see* macrocephalum var.).
lævigatum of gardens (*see* prunifolium).
Lantana, 6′ to 20′, My., wh. Common Wayfaring Tree.
— foliis-aureis variegatis, variegated wh., yel.
lantanoides, 6′, My., wh. Hobble Tree, American Wayfaring Tree.
Lentago, 15′ to 30′, My. wh. Sheep Berry, Sweet Viburnum.
— subpedunculatum, flower stalks ⅜″ in length.
macrocephalum Keteleeri, 20′, Je., wh.; wild type.
molle, 6′ to 12′, Jy., wh.
nitidum (*see* nudum).
nudum, 6′ to 10′, My., wh. (*syn.* nitidum). American Withe Rod.
— cassinoides (*see* cassinoides).
— Claytoni, lvs. almost whole.
obovatum, 2′ to 8′, My., wh.
orientale, 6′ to 10′, Jy., wh.
pauciflorum, 2′ to 5′, sum., wh.
pirifolium (*see* prunifolium).
plicatum (*see* tomentosum var. plicatum).
pubescens, 3′ to 6′, Je., wh.
reticulatum of gardens (*see* Sieboldii).
rigidum, 4′ to 6′, Dec., hlf-hdy. (*syn.* rugosum).
rugosum (*see* rigidum).
Sargentii, near Opulus, but anthers pur. and ray flowers larger.
Sieboldii, lvs. dark grn., opposite (*syn.* reticulatum of gardens).
Vetteri, hybrid (Lentago × nudum).

VICIA. (Vetch, Tare.)

An extensive genus of hardy perennial or annual herbs (*ord.* Leguminosæ), of which only a few are ornamental, though several (especially sativa) are useful as fodder. They are propagated by seeds; the perennials by division also. Common soil.

Principal Species :—

argentea, 1′, Je., per., pk., blk.
atropurpurea, 3′, Je., ann., pur.
Cracca, 2′ to 6′, Je., per., bl. Cow Vetch.
dennesiana, My., per., pale br. to pur.
Faba (*see* Bean, Broad).
fulgens, 3′ to 4½′, Je., ann., sc.
galegæfolia (now Swainsona coronillæfolia).
lathyroides, 8″, My., ann., lil. Spring Vetch.
narbonensis, 3′, Je., ann., pur.
onobrychioides, 2′, Je., ann., pur.
oroboides, 1′ to 2′, Je., per., bl. (*syn.* Orobus lathyroides of *Botanical Magazine* 2098).
— alba, wh.
pyrenaica, 1′, My., per., pur.
sativa, 3′, My., ann., pur.
sicula, 6″, My., per., pur. (*syn.* Orobus Fischeri).
sylvatica, Je., per. trailer, bl., wh.
tenuifolia, 1½′, Je., per. climber, vio.

VICTORIA.

(*Ord.* Nymphæaceæ.) The only species recognised by the *Index Kewensis* is regia, a magnificent stove aquatic plant, which has excited universal admiration and wonder since its introduction in 1838. The great leaves are sufficient to support a child on the surface of the water, and the fine flowers are about 1′ across. Recently a hardier sort has been introduced under the name of Trickeri. This is said to be hardy in some places, but should have at least greenhouse cultivation in this country. Propagation is effected by seeds in a pot of loam sunk in a tank, with a temperature not under 85° in January. Prick off the seedlings into separate pots, and plant out in the tank early in May, giving a water temperature of 80° or rather more. Give plenty of sun. Trickeri may be sown in a warm greenhouse in early spring.

Only Species and its Variety :—

regia, sum, aquatic, wh., pur., or ro., lvs. 4′ to 6½′ across, with turned up margin. Royal Water Lily, Queen Victoria's Water Lily, etc. (*see p.* 429).
Trickeri, resembles above, but smaller in all its parts, hardier, regarded as regia var. amazonica by prominent British botanists, but American authorities have now concluded that it is the true V. cruziana of Orbigny.

VIGNA.

Half-hardy or hardy annuals (*ord.* Leguminosæ), of climbing habit. Propagation, by seeds in gentle heat in March, planting out of doors late in May. Soil, light, sandy loam.

Principal Species :—

Burchellii, 10′, sum., grh., pur. (*syn.* Otoptera Burchellii).
Catjang, 10′, Jy., red, yel. (*syns.* sinensis, Dolichos sesquipedalis, D. sinensis of *Botanical Magazine* 2232, D. tranquebaricus, and D. unguiculatus).
glabra, 10′, Jy., yel. (*syn.* Dolichos luteolus).

VIGUIERA.

Stove herbaceous perennials (*ord.* Compositæ). Propagation, by division, or cuttings in spring, the latter beneath a bell-glass. Soil, fibrous loam and sandy, fibrous peat.

Principal Species :—

helianthoides, 3′, Jy., yel. (*syn.* dentata).
linearis, 2′, Sep., hlf-hdy., yel. (*syn.* Helianthus linearis).
prostrata, 1′, Jy., yel., hdy. in sheltered southern districts (correctly Helianthus tracheliifolius).

VILLAMILLA.

Stove evergreen shrubs (*ord.* Phytolaccaceæ). Propagation, by cuttings in sand beneath a bell-glass over bottom heat. Soil, light loam and coarse sand.

Principal Species :—

octandra, 2′, My., wh. (*syn.* Rivina octandra).

VILLANOVA.

Hardy annuals (*ord.* Compositæ), allied to Palafoxia. Propagation, by seeds in May, in any ordinary soil where the plants are to flower.

Principal Species :—

chrysanthemoides, 1½′, Sep., yel.

VILLARESIA.

Stove shrubs (*ord.* Olacineæ). Propagation, by cuttings of half-ripened growths in very sandy peat beneath a bell-glass over bottom heat. Soil, light, fibrous loam three parts, and fibrous peat one part, with coarse sand.

Principal Species :—

emarginata, 6′ to 20′, Sep., wh. (*syn.* mucronata).

VILLARSIA.

Aquatic or bog plants (*ord.* Gentianeæ), needing greenhouse or stove protection, though some species, notably parnassifolia, are hardy in sheltered southern waters. Propagation, by division

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Victorian Hazel (*Pomaderris apetala*).
Vieusseuxia (*see Moræa*).

and seeds in spring, in heat. Many species formerly included are now referred to Limnanthemum and Menyanthes (which *see*).

Principal Species :—

capitata, 4″, sum., yel.
ovata, 6″, Jy., citron yel. (*syn.* Menyanthes ovata).
parnassifolia, 2′, Aug., yel. (*syn.* Menyanthes exaltata).
reniformis, 1′, Jy., yel.

VILMORINIA.

A stove evergreen (*ord.* Leguminosæ). Propagation, by cuttings of half-ripened growths in sand, beneath a bell-glass, or by seeds, soaked prior to sowing, in heat. Soil, fibrous loam and peat, with coarse sand.

Only Species :—

multiflora, 6′, My., pur. (*syn.* Clitoria multiflora).

VINCA. (Periwinkle.)

Hardy and stove evergreens (*ord.* Apocynaceæ). Propagation, by division or cuttings, in a shaded position, in spring ; outdoors for the hardy ones ; cuttings in a close, warm case for the tender ones. Any ordinary soil suits. The hardy species are valuable because they will grow well under trees, where practically no other plant would live. Good loam, leaf soil, a little cow manure, and sand suit the tender species.

Principal Species and Varieties :—

difformis, 1′, Aug., hdy., bl. (*syn.* media).
major, 2′, Ap. to Aug., hdy., pur.
— variegata, 2′, Aug., hdy., pur. : handsome variegated lvs. (*see p.* 430)
media (*see* difformis).
minor, 1′, Mch. to Aug., hdy., bl.
— flore pleno, double flowered, not common.
rosea, 1′, My., st., ro.
— alba, 1, Je., st., wh.

Other Species :—

acutiflora (*see* difformis).
herbacea, 1½′, Je., Jy., hdy., pur.
pusilla, 9″, Aug., st. ann., bl.

VINCETOXICUM.

Hardy herbaceous perennials (*ord.* Asclepiadeæ).

Victoria regia (*see p.* 428).

VIMINARIA. (Rush Broom.)

Evergreen shrubs (*ord.* Leguminosæ), allied to Daviesia, and requiring greenhouse culture. Propagation, by cuttings of half-ripened growths in spring. Soil, equal parts of loam and peat, both fibrous, with coarse sand.

Only Species :—

denudata, 3′ to 20′, Aug., or. yel. (correctly Jacksonia scoparia).
lateriflora, 3′, Jy., yel.

VINCA. (Periwinkle.)

Hardy and stove evergreens (*ord.* Apocynaceæ). Propagation, by division or cuttings, in a shaded position, in spring ; outdoors for the hardy ones ; cuttings in a close, warm case for the tender ones. Any ordinary soil suits. The hardy species are valuable because they will grow well under trees, where practically no other plant would live. Good loam, leaf soil, a little cow manure, and sand suit the tender species.

Principal Species :—

fuscatum, 3′, Jy., yel. (*syn.* Cynanchum minus).
nigrum, 3′, Jy., br. (*syn.* Cynanchum nigrum).
officinale, 3′, My., wh. (*syns.* Cynanchum laxum and C. Vincetoxicum).

VINES (*see* Grapes and Vitis).

VIOLA.

Description.—A valuable genus (*ord.* Violaceæ) of hardy or half-hardy herbaceous plants, whose ease of culture, extraordinary floriferousness, and frequently great fragrance, warrant their inclusion in every garden.

Vine Bower (*see Clematis Viticella*).
Vine Maple (*Acer circinatum*).

Propagation.—By seeds sown in gentle heat in February, by division in spring or autumn, and by cuttings. The last named is the best method for the popular garden varieties, and the cuttings should be inserted in a cold frame in August or September, in a mixture of loam, peat, and sand. As much fresh air as possible should be admitted.

Soil.—Violas will grow in any except an absolutely impoverished medium, but the most satisfactory results are ensured with a deep loam, with which decomposed manure has been somewhat generously incorporated.

Other Cultural Points.—Florists' Violas are invaluable for the margins of large beds and borders, and for carpeting beneath tall growing plants. Many of the species make lovely plants for the rock garden. All flowers should be removed as they commence to fade. When the best of the late spring display is over, the plants may be closely clipped over with hedging shears; they will look bare for a time, but new growths will push quickly, and a magnificent second crop of flowers will be ensured.

Other Species and Varieties :—

arenaria, 3″, My., bl.
blanda, 6″, My., wh.
campestris, 6″, Ap., pur.
canadensis, 6″, My., wh.
declinata, 3″, Je., bl.
hederacea, 2″, Jy., hlf-hdy., bl.
hirta, 6″, Mch. to My., lil.
lanceolata, 3″, Je., wh.
lutea, 3″, Je., yel.
— amœna, bl., pur.
mirabilis, 3″, Jy., bl.
prostrata, 3″, Je., crin
Selkirkii, 6″, Je., bl.
striata, 6″, sum., crim. or pur., with wh. lines.
variegata, 3″, My., vio.

Selection of Garden Varieties :—

White :—

Bethea. Marchioness. Mrs. Kinnaird.
Christiana. Marchioness of Tweeddale. Pencaitland.
Countess of Hopetoun. White Empress.

White and Blue :—

Blue Cloud. James Cocker. Shamrock.
Countess of Kintore. Laverock. White Duchess.
Edina. Norah May. W. P. A. Smith.

VINCA MAJOR VARIEGATA (*see p.* 429).

Principal Species and Varieties :—

alpina, 3′, Je., pur.
altaica, 6″, My., pur.
biflora, 3″, Je., yel.
calcarata, 6″, My., bl.
— albiflora, wh.
— pallida plena, double lavender.
canina, 4″, My., variable, bl., lil., grey, or wh.
cornuta, 6″, spr., sum., bl.
— alba, wh.
cucullata, 4″, spr., vio. bl., or pur.
gracilis, 3″, Je., pur.
— Valderia, 2″, pur.
lactea, 6″, My., grey.
munbyana, 4″, spr., vio.
— lutea, yel.
odorata, 6″, spr., aut., bl., wh., or pur. Sweet Violet.
— alba, wh.
— pallida plena, double lavender.
palustris, 4″, My., wh. or lil.
pedata, 6″, My., bright bl.; alba, atropurpurea, and bicolor are vars.
pubescens, 3″, Je., yel.
rothomagensis, 6″, sum., bright bl., blk. marks.
sagittata, 6″, Jy., pur. bl.
sylvestris, 6″, spr., bl.
tricolor, 6″, sum., aut., yel., pur., wh. The Pansy or Heartsease.

Blue :—

Archie Grant. Blue Duchess. Favourite.
Blue Bedder. Blue Gown. True Blue.

Yellow :—

Ardwell Gem. Lord Elcho. Sylvia.
Bullion. Primrose Dame. Wonder.

Yellow and Blue :—

Duchess of Fife. Golden Fleece. Goldfinch.

Purple :—

Acme. Mrs. C. Turner. The Mearns.

Mauve :—

Bessie Clarke. Duchess of Sutherland. J. B. Riding.

Lilac or Rose :—

Lilacina. Princess Beatrice. Wm. Neil.
W. Smith.

Bronze :—

Bronze Kintore. Bronze Prince.

Crimson Shades :—

Councillor Waters. Crimson King. Mrs. James Fisher.
Lucy Bertram.

Miniature or Violetta Varieties :—

Blanche.	Gold Crest.	Violetta.
Blush Queen.	Picotee.	

VIOLET.

Description.—Amongst British plants none has a greater popularity or is more universally admired than the Sweet Violet. The Dog Violet grows in shady places, and does not appear to be fastidious in respect of soil.

Propagation.—By runners, much in the same manner as is adopted with Strawberries. The number of runners should be strictly limited, so as to ensure strength in those retained. To leave all the runners means a mass of weak, spindly growths, which rarely make satisfactory plants. The runners should be pegged down into the soil between the plants, and in a few weeks will be well rooted if the soil is kept pleasantly moist. Some varieties are best propagated by division.

Soil.—A medium sandy loam, of considerable depth, is the best for Violets. If poor, decayed manure must be incorporated with it; and if heavy, an abundance of gritty matter should be worked in, as the plants are frequently unsatisfactory in a stiff, adhesive medium. Immediately prior to planting, the soil should be deeply dug, and subsequently made moderately firm. The smaller growing varieties should be 10″ asunder all ways, and those of more robust growth, like some of the comparatively modern singles, are best 15″ apart.

Summer Culture.—This consists of planting the stock in April or May on a cool, deeply worked border, which, although well open to the light, is sheltered from bright sunshine; and in keeping the plants well supplied with moisture, frequently syringing them to guard against red spider. Mulch with spent Mushroom bed manure, and in the case of plants required to flower in pots or frames during winter, prevent the formation of runners.

Winter Culture.—Brick pits or well-made wooden frames are needed to secure the best results, and they should face south or south-east, so that the plants in them may receive ample light. About the middle of September place a quantity of well-turned stable litter, mixed with leaves, in the frame or pit, leaving room for 6″ of soil, so that after planting the Violets come within a few inches of the glass. Lift and plant the strongest crowns in the frames at the end of September or early in October, and guard against any delay between lifting and planting. Water well, and keep the frame rather close for a week, until the plants have recovered from the check. Afterwards admit air freely, removing the lights altogether on fine days, and only keeping them quite shut during very severe frost or dense fog. Prevent runner formation, frequently stir the surface soil, remove damped or broken foliage as soon as detected, pick the flowers at least every other day, and protect the plants by means of garden mats when necessary.

Violets in Pots.—Pot culture is but a modification of that already advised. Remove the plants from the frame to a cool greenhouse for the winter, and place them in the conservatory when flowering freely.

Enemies.—Red spider is the worst, but it need not be feared if cool, moist conditions are provided. Several species of Fungi attack Violets, more especially those grown in a close atmosphere. Puccinia Violæ is the worst of these, and when the stock is thoroughly infested with it the case is hopeless. The grower should root up and burn the plants, and not use the soil again for Violets. Spraying with sulphide of potassium (1 oz. to 3 gallons of water) serves as a preventive if used at brief intervals, but the best method of prevention is careful cultivation, *i.e.* strong plants to start with, and, subsequently, conditions that ensure firm, sturdy growth.

A Selection of Varieties :—

Single Flowered :—

California, bl., long stems.	Princess of Wales, vio., pur., long stems, very sweet.
Czar, deep bl.; fine for win.	wellsiana, rounded, vio. pur.
devoniensis, bl., free.	White Czar, wh.
La France, rounded flowers, vio. bl.	

Double Flowered :—

Comte de Brazza, wh.	Mrs. J. J. Astor, rosy pur.
de Parme, lavender.	Neapolitan, mauve, wh. centre.
Marie Louise, lavender, wh.; the finest for win. flowering.	New York, mauve, very sweet.
Mdlle. B. Barron, rich bl., very free.	Queen, wh., flushed ro.

VIRGILIA.

The only species (*ord.* Leguminosæ) is a greenhouse tree, propagated by cuttings of the half-ripened shoots in sand, in a close case, in spring, also by seeds; and thriving in a compost of equal parts of loam and peat, with sand.

Only Species :—

aurea (now Calpurnia lasiogyne).	instrusa (now Calpurnia intrusa).
capensis, Jy., rosy pur., lvs. with six to ten pairs of leaflets (*syn.* Podalyria capensis).	lutea (now Cladrastis tinctoria).

VIRGINIAN CREEPER (*see* AMPELOPSIS and VITIS).

VIRGINIAN STOCK (*see* MALCOMIA MARITIMA).

Violet, Adder's (*Goodyera pubescens*).
Violet, African (*see Saintpaulia*).
Violet, Bog (*see Pinguicula*).
Violet, Cape (*see Ionidium*).
Violet, Corn (*Specularia hybrida*).
Violet, Dame's (*see Hesperis matronalis*).
Violet, Dog's (*see Viola canina*).
Violet, Dog's Tooth (*see Erythronium Dens-canis*).
Violet, False (*Rubus Dalibarda*).
Violet, Foreign (*see Schweiggeria*).
Violet, Fringed (*see Thysanotus*).
Violet, Mercury's (*see Campanula Medium*).
Violet, Spurless (*see Viola hederacea*).
Violet, Tongue (*see Schweiggera*).
Violet, Water (*see Hottonia palustris*).
Viper Gourd (*Trichosanthes Anguina*).
Viper's Bugloss (*see Echium*).
Viper's Grass (*see Scorzonera hispanica*).
Virgea (*see Rhododendron*).
Virginian Cowslip (*see Mertensia virginica*).
Virginian Poke Weed (*see Phytolacca decandra*).
Virginian Silk (*see Periploca græca*).
Virgin's Bower (*see Clematis*).
Virola (*see Myristica*).

VISCARIA (*see* LYCHNIS).

VISCUM.

Shrubby parasites (*ord.* Loranthaceæ), found growing on trees of various kinds. There are about thirty species, the larger number occurring in tropical countries, whence they have never yet been successfully introduced. Only one species, the native album, 2′, May, green, is generally known, for those not familiar with the plant in a growing state recognise the berried growths imported so largely from Normandy as an indispensable item in Christmas decorations. (*See* MISTLETOE.) Cruciatum, 1′ to 2′, March, red fruit, a parasite on the common Olive, is cultivated in some gardens. At Kew it is growing on a plant of Pyrus torminalis.

VISMIA.

Stove evergreen shrubs (*ord.* Hypericineæ). Propagation, by cuttings of side growths, getting firm at the base, in sand. Soil, fibrous loam and peat in equal parts, with sand and a little charcoal.

Principal Species :—

brasiliensis, 8′, Aug., yel.
glabra, 10′, Jy., red.
guianensis, 8′, Aug., yel.
guineensis, 6′, My., yel.
sessilifolia, 6′, My., yel.

VISNEA.

Greenhouse evergreen trees (*ord.* Ternstrœmiaceæ). Propagation, by cuttings, in sand, beneath a bell-glass. Soil, equal parts of loam and peat.

Principal Species :—

Mocanera, 6′, Mch., whitish grn.

VITEX.

Hardy deciduous or stove evergreen trees and shrubs (*ord.* Verbenaceæ). Propagation, by cuttings in autumn, the hardy species under a hand-light, and the stove species in heat. Light, well-drained soil suits the hardy forms, and a mixture of loam, peat, and sand the tender ones.

Principal Species :—

Agnus-castus, 6′, Aug., pale lil., almost wh., hdy.
bignonioides, 8′, Jy., st., bl.
capitata, 6′, Je., bl.
Negundo, 4′, sum., pur.
trifolia, 5′, Jy., bl. ; there is a var. with variegated lvs.
umbrosa, 25′, sum., pur.

VITIS. (VINE.)

Description.—A great and important genus of greenhouse, stove, or hardy creeping or climbing shrubs (*ord.* Ampelideæ), some of which—vinifera, the original of our Grape Vines (*see* GRAPES), is the chief—are valued for their fruit, and many are ornamental on trelliswork, walls, or trees. The cultivation of these hardy, ornamental-foliaged Vines is greatly on the increase, and the fine tints the leaves assume in autumn add greatly to their value. Ampelopsis and Cissus may also be referred to for some of the species botanically included with Vitis, but known in gardens by those names.

Propagation.—By eyes or by cuttings, the former being the general method for Grape Vines in this country, and the latter for the species. Layering, grafting, budding, and inarching may also be practised, and some of the species are occasionally raised from seeds.

Soil.—Good fibrous loam for the species. (*See* GRAPES for the Grape Vines.)

Principal Species and Varieties :—

[NOTE.—fr. = fruit.]

æstivalis, My., hdy. cl., fr. blk. American Summer Grape.
californica, sum., hdy. cl., fr. blk., lvs. small, crim. in aut.
candicans, hdy. cl., fr. blk., lvs. handsome, heart shaped, wh. beneath.
Coignetiæ, lvs. very handsome, large, becoming crim. or claret coloured in aut.
Engelmanni, lvs. palmate, climbs by means of stem roots ; an excellent species for walls or trees.
flexuosa major, fine, decorative, hdy. Vine ; the three-lobed lvs. are 6″ or more across, finely coloured in aut.
heterophylla humulifolia, low hdy. cl., pretty foliage, fr. china bl., blk. spotted. Turquoise-berry Vine.
— humulifolia variegata, lvs. variegated.
inconstans, the correct name of Ampelopsis tricuspidata (Veitchii ; *syn.* japonica of gardens). Small-leaved Virginian Creeper.
Labrusca, 20′ and upwards, Je., very hdy. cl., sweet scented, fr. pur. or yellowish, lvs. heart shaped, roundish. The parent of a number of vars., and used in raising new Vines to withstand Phylloxera Fox Grape. Plum Grape, Isabella Grape.
lanata, hdy. cl., grn., fr. pur., lvs. pubescent, finely coloured in aut.
pterophora, st. cl., with interesting habit, lvs. trifoliolate, on long stalks ; tubers formed at end of branches, and detached, make young plants (*syn.* gongylodes).
Romanetii, hdy. cl., lvs. variable, grn. above, wh. below (*syns.* pseudospina and Ampelovitis Romanetii).
— obtusifolia, heart shaped, wh.
— serotina, later fruiter.
— variegata (Mme. Caplat).
vinifera, hdy. cl., fr. variable ; the original of the Grape Vines (*see* Grapes).
— laciniosa, lvs. in five deeply cleft segments (*syn.* apiifolia).

Other Species and Varieties :—

acuminata, grh. or st. cl., lvs. rounded, pointed, toothed, glabrous above, glaucous wh. below, fr. blk.
ægirophylla, hdy. cl., lvs. pale, glabrous, ovate, pointed, fr. small.
albo-nitens, st. cl., lvs. marked silvery wh. (*syn.* Cissus albo-nitens).
amazonica, st. cl., lvs. large, oval, pointed, silver veined, red below (*syn.* Cissus amazonica).
amurensis, lvs. entire or lobed, woolly (*syn.* vinifera amurensis).
antarctica, grh. cl., lvs. ovate or oblong, fr. round (*syn.* Cissus antarctica). Kangaroo Vine.
apiifolia (*see* vinifera laciniosa).
argyrophylla (an error for ægirophylla).
Bainesii, 4½′, succulent st. tree, non-climbing.
Berlandieri, hdy. or hlf-hdy., stems pubescent, lvs. round, heart shaped, with three lobes, fr. dark vio. (*syn.* monticola of Engelmann).
capensis, grh. trailer, lvs. kidney shaped, angled, toothed, fr. dark red.
capreolata, hdy. cl. on wall in the south of England, fr. small, blk., lvs. pretty, five-foliate.
chontalensis, Dec., st. cl., sc., lvs. bright grn., trifoliolate (*syn.* Cissus chontalensis).
cinerea, hdy. cl., lvs. about 1′ across, glossy above.
— canescens, lvs. smaller, prettier.
cirrhosa, grh. shr., stems with long tendrils, lvs. glabrous.
cordifolia, My., hdy. cl., fragrant, fr. bl. or blk., lvs. heart shaped, toothed, three lobed. Winter, Chicken, or Frost Grape.
davidiana (*see* heterophylla).
doaniana, hdy. cl., lvs. and branches whitish.
Endresii, st. cl., lvs. deep grn., red veined, heart shaped.
flexuosa, hdy. cl., lvs. heart shaped, toothed.
gongylodes (*see* pterophora).
heterophylla, tall cl., fr. inedible, lvs. palmately lobed.
hypoglauca, grh. shr.,

yel., pretty, young lvs. glaucous below.
indivisa, hdy. cl., lvs. simple, rather three lobed, fr. very small (*syn.* Ampelopsis cordata).
japonica, hlf-hdy. cl., lvs. compound, glabrous (*syn.* Cissus japonica).
—marmorata, yel. blotches on lvs.
— of gardens (*see* inconstans).
javalensis, st., sc., lvs. very fine, simple, heart shaped, grn., velvet-like, (*syn.* Cissus javalensis).
Lindeni, grh. cl., lvs. grn., spotted wh.
Macropus, 2½′, dwarf st. tree, of no beauty, trunk bulb-like.
monticola, hdy. cl., lvs. heart shaped, fr. wh. or yel., well flavoured: said to be a form of æstivalis.
— of Engelmann is Berlandieri.
multifida gracilis, hdy. cl., lvs. deeply lobed, fr. blk.
odoratissima (*see* riparia).
orientalis, hdy. or hlf-hdy., lvs. triangular.
planicaulis, st. cl., glabrous, leaflets oblong lanceolate.
quadrangularis, warm grh. cl., interesting, four winged, usually leafless, stems contracted at the nodes.
quinquefolia, lvs. palmate, a common wall plant. Large-leaved Virginian Creeper.
riparia, like cordifolia, but with broader, lobed lvs. (*syn.* cordifolia riparia).
rupestris, hdy., lvs. roundish kidney shaped, stem striated, fr. bluish blk., small.
rutilans, red, stems and leafstalks with red bristles, lvs. large, heart shaped, tomentose.
sempervirens (*see* striata).
Sieboldii (*see* Thunbergii).
striata, hdy. or hlf-hdy. ev. cl., lvs. dark grn., digitate, fr. reddish, small.
Thunbergii, handsome hdy. cl., lvs. large, three to five lobes, glabrous or pubescent above, tomentose below (*syn.* Sieboldii).
voinieriana, st. cl., fr. large, lvs. of three leaflets; possibly not a Vitis.
vulpina, hdy. cl., lvs. small, glossy, fr. Musk scented, pur., thick skinned, without bloom. Bullace Muscadine.

Grape Vines.—(*See* GRAPES for cultivation and selections.)

American Grapes (from Labrusca) :—

Black, Purple, or Red :—

[NOTE.—All small, musky, and in small bunches.]

Brighton, sweet, blk.
Jefferson, sweet, red.
Moore's Early, sweet, pur. blk.
Strawberry, sweet, pur. red.

White or Yellow :—

Duchess, sweet, wh.
Eldorado, sweet, yel.
Golden Pocklington, sweet, yel.
Lady, rich, deep yel.

VITTADINIA.

A genus of about fourteen species of greenhouse or hardy perennial herbs or sub-shrubs (*ord.* Compositæ), allied to Erigeron. Few, if any, are in cultivation. Triloba of gardens is Erigeron mucronatus, which *see*. The Vittadinias are propagated by seeds or cuttings, and like a sandy soil.

VITTARIA.

A genus of stove Ferns (*ord.* Filices), with Grass-like fronds and the brown sori or spore cases in continuous lines at or near the margins. (*See* FERNS for cultivation.)

Principal Species :—

elongata, fronds 6″ to 18″ long, ⅛″ to ¼″ broad, sori sunk in a groove (*syns.* ensiformis and zosteræfolia).
lineata, fronds 6″ to 18″ long, ⅛″ to ¾″ broad, narrowing to the base, sori in a shallow furrow, (*syn.* Tæniopsis lineata). Florida Ribbon Fern.
scolopendrina, fronds 1′ to 1½′ long, ½″ to ¾″ broad, pointed, base gradually narrowing, sori in broad, submarginal lines (*syn.* Tæniopsis scolopendrina).
stipitata, fronds 1½′ to 2′ long, ¼″ to ½″ broad, tapering to the base, sori in a groove inside the margin (*syn.* Tæniopsis stipitata).

VIVIANIA.

A small genus of stove or greenhouse shrubs, herbs, or sub-shrubs (*ord.* Geraniaceæ), scarcely, if at all, cultivated at present. Propagated by cuttings of young growths in sand under a glass. Soil, loam, peat, and a little sand.

Principal Species :—

grandifolia, 1′ to 2′, Jy., grh., wh. or red.
parvifolia, 1′ to 2′, Jy., grh., ro.

VOANDZEIA (*syns.* CRYPTOLOBUS and GEOLOBUS. BOMBARRA GROUND NUT, UNDERGROUND BEAN).

An interesting stove herb (*ord.* Leguminosæ), with a hypogæous habit, *i.e.* the flower stems bend after flowering so as to insert the seed pods in the soil to ripen. Propagated by seeds. Common soil.

Only Species :—

subterranea, 3″, Jy., pale yel.

VOCHISIA. (Also spelled VOCHYSIA.)

A genus of stove trees or shrubs (*ord.* Vochysiaceæ), with scented flowers in panicles or racemes. The only ones known to cultivation are the undernamed, which are propagated by cuttings of ripened wood in heat under a bell-glass in a very sandy soil. Soil, loam and peat.

Only Cultivated Species :—

ferruginea, 25′, Aug., yel. (*syn.* tomentosa).
guianensis, 12′ or more, Aug., yel. Copai-yé-wood.

VOYRIA (*syn.* VOYRA).

A genus of dwarf, leafless, stove herbaceous perennials (*ord.* Gentianeæ), propagated by seeds and divisions in spring. Soil, sandy loam with a large proportion of leaf soil or peat. The following are probably not now in cultivation.

Principal Species :—

aphylla, Je., yel. (*syn.* uniflora).
cærulea, Je., bl.
rosea, Jy., red.

WACHENDORFIA (*syn.* PEDILONIA).

A small genus (*ord.* Hæmodoraceæ) of greenhouse or nearly hardy perennial herbs, with tuberous roots. Propagation is by seeds and offsets. Soil, sandy loam three parts and peat one part. Wachendorfias do best if planted out in prepared beds in pits and frames. When the plants are at rest practically no water is needed, for if water be given the roots may rot.

Principal Species and Variety :—

paniculata, 1½′, Ap., grh., golden yel., lvs. sword shaped, three nerved.
— pallida, paler yel.
thyrsiflora, 2′, My., grh., yel. in spikes, lvs. sword shaped, five nerved.

Vitmania (*see Oxyhaphus*).
Volkameria (*see Clerodendron*).
Vriesia (*see Tillandsia*).
Vulneraria (*see Anthyllis*).

Other Species and Variety :—

hirsuta, 1½′, Ap., grh., red in bud, yel. when expanded, drooping.
— brevifolia, 1′, Ap., grh., crim., yel. (*syn.* brevifolia).

WAHLENBERGIA.

This is a large genus (*ord.* Campanulaceæ) of greenhouse and hardy annual and perennial herbs, some of which have woody stems. Comparatively few of them are grown, although upwards of a dozen species are to be found in catalogues. Culture as for the hardy Campanulas, which *see*.

Principal Species :—

hederacea, Jy., Aug., hdy. per., fine, creeping, pale bl. stems (*syn.* Campanula hederacea).
Kitaibelii, 6″, sum., hdy. per., bl., flushed pur, tufted habit.
saxicola, 2″ to 8″, Je., grh. or hlf-hdy. per., pale lil. (*syns.* albo-marginata and Campanula saxicola). New Zealand Bluebell.
tenuifolia, 3″ to 6″, Je., Jy., hdy. per., vio., bl., wh., habit tufted (*syn.* Edraianthus tenuifolius).
tuberosa, 6″ to 24″, sum., grh. per., wh., banded externally ro., habit branching, roots tuberous.

Other Species :—

albo-marginata (*see* saxicola).
capensis, 1′ to 1½′, hlf-hdy. ann., dark bl., grn. (*syns.* Campanula capensis and Roella decurrens).
capillacea, 1′ to 1½′, My., grh. per., bl.
dalmatica, sum., hdy. per., vio., bl.
gracilis, 6″ to 24″, Ap., grh. ann., bl., pur., or wh. (*syns.* Campanula capillaris and gracilis). Austrian Harebell.
graminifolia, 3″, sum., hdy. per., pur., in terminal clusters, lvs. Grass-like.
Pumilio, My., Jy., hdy. per., bl. or lil. bl.
serpyllifolia. (By *Index Kewensis* the correct name is Campanula serpyllifolia, but the *Kew Hand-List* keeps up Wahlenbergia serpyllifolia.)
undulata, 6″ to 12″, sum., hlf-hdy. ann., vio., bl.

WAITZIA.

Greenhouse annuals (*ord.* Compositæ). Several pretty plants are included, but they are little known to cultivators. Propagation, by seeds sown in heat, the subsequent treatment being as for half-hardy annuals. Soil, loam two parts, leaf mould one part, dried cow manure one part, and sand.

Principal Species :—

aurea, 1′ to 2′, sum., bracts yel. (*syn.* Morna nitida).
grandiflora, 1′ to 2′, sum., resembles aurea, but heads larger.
nivea (*see* odontolepis).
odontolepis, 1½′, sum., wh., pk., or pale yel. (*syns.* nivea and Morna nivea).

Other Species :—

acuminata (*see* corymbosa).
corymbosa, 1′ to 2′, sum., dark yel., flushed pk., sometimes with wh. areas (*syn.* acuminata).
steetziana, 10″, sum., wh. to pale yel. (*syn.* tenella).
tenella (*see* steetziana).

WALDSTEINIA.

A small genus of hardy perennial herbs (*ord.* Rosaceæ), of creeping habit, much like that of the Fragarias. They are all pretty plants, easy to grow, and thrive in almost any soil. Propagation, by divisions in spring, and by seeds, which germinate freely if not sown deeply.

Principal Species :—

fragarioides, Je., hdy., yel. (*syns.* Comaropsis fragarioides and Dalibarda fragarioides).
geoides, Je., hdy., yel.
trifolia, 4″ to 6″, Ap., My., hdy., yel.

WALKS.

It is highly important that walks should be well made and properly proportioned to their surroundings. Hints as to their general trend and the purposes which they serve have already been given under LANDSCAPE GARDENING and PATHS. It may be noted here, however, that whatever substance the surface of the walks may be made of, it should be possible to walk upon it in all but the worst of weathers, and, in order to secure this, the walk must be thoroughly made in the first instance. In some localities, where the subsoil is a very pervious gravel, little is done besides roughly levelling the ground and putting on a coat of gravel or ashes. This method, however, is not to be recommended.

The amount of work needed in the construction of a good walk will depend almost entirely upon the traffic that the path is expected to carry, considered with the lie of the ground, and the character of the soil and subsoil. Thus paths and roads that are meant to bear heavy vehicular traffic have to be excavated to a considerable depth, and plenty of rough stuff worked in to serve as foundation (*see* ROADS). The gravel paths of the kitchen garden, which have to carry rather lighter traffic, should be dug out to the depth of at least 6″, 4″ of rough foundation being used, and about 2″ of finer gravel, the top 1″ being the finest. Heavy and repeated rollings are in every case requisite. In making all gravel paths and roads it is important that the edges should first be determined, and the nearer these two edges are on the same level the easier the work will be. It is not difficult to obtain the levels. Borning rods, a 10′ to 12′ straight-edge, and a spirit level are the tools required.

Once the edges are cut, the levels obtained, and the foundation placed in position, a row of pegs should be driven down the centre to serve as a guide for laying on the top fine gravel. It is quite easy to remove these pegs as the work of finishing off proceeds.

The draining of walks is an important item. The usual plan is to lay 3″ pipes under the rough ballast at each side of the walk, taking these drains to the nearest outlet. Take-away pipes, guarded with iron gratings, communicate with the drain pipes. Frequently each take-away is provided with a trap, to prevent sediment from choking up the drains. These traps should be frequently examined and cleaned out.

The height of the centre of the walk above the level of the edges will depend upon the width. Thus, in an 8′ walk the centre will be about 4″ higher than the edges, ½″ being added for every additional 2′ in width.

The width of walks must in all cases depend

Wafer Ash (*Ptelea trifoliata*).
Wailesia (*see Dipodium*).
Wake Robin (*see Arum maculatum and Trillium grandiflorum*).
Walkera (*see Gomphia*).
Walking Leaf (*Scolopendrium rhizophyllum*).

upon their position, and the work they are intended to do, so that they may vary from 2′ for pedestrian traffic only, to 30′ wide for carriage drives.

Asphalte and concrete are occasionally employed for paths whose gradient is steep, for, when this is the case, heavy rains rinse and gutter the surface badly and it is impossible to keep a smooth and even pathway. Ashes make a clean and useful path for foot traffic, and for shaded, woodland walks they are very suitable. Grass paths are high in favour in the flower garden, and, while open to the objection that they are damp to the feet in wet weather, much of this may be obviated by keeping the grass closely cut with the machine. As to the beauty of grass paths there can be no two opinions.

Photo: W. Rossiter, Bath.

A GARDEN WALK BORDERED WITH CLEMATISES.

Turf is not suitable, however, for shaded walks, as the roots of the trees exhaust the moisture and the grass dies, or moss flourishes and chokes the grass, so that the walk speedily becomes one of moss rather than of grass.

All gravel paths need to be kept in condition by regular rollings. A capital surface dressing for the summer months is to be found in the crushed shell supplied by the sundriesman. This picks up badly in wet weather, but forms an agreeable foothold during dry spells. Other items of up-keep are the annual trimming of the edges, the filling up of ruts caused by heavy rain, and the occasional replacing in the centre of gravel which has been worked to the sides, following the natural tendency to level down.

Wall Cress (*see Arabis*).
Wall Fern (*see Polypodium vulgare*).

WALLFLOWER.

Description.—For spring blooming the fragrant Wallflower, Cheiranthus Cheiri (*ord.* Cruciferæ), has no superior, no matter whether we consider its hardiness, its free blooming propensities, its effectiveness, or the ease with which it may be grown. Strictly speaking a perennial, the best results are obtained when the plants are treated as biennials, for they become straggling and unkempt in appearance in the third year.

Propagation.—By seed, which should be sown about the end of May or the beginning of June, in a sunny border, in sweet but rather poor soil. Many people have made the mistake of manuring the soil for Wallflowers, and the result has been apparent in gross growths which failed to stand the winter. The seed may be sown broadcast, or in drills about 10″ apart. In any case it is necessary to transplant the seedlings, which in the nursery beds should stand 6″ apart in the rows, the latter 1′ asunder.

Other Cultural Points. — Subsequent culture consists in keeping down weeds, hoeing occasionally to promote soil aëration, and watering. The final consignment to the flowering quarters takes place after the summer occupants have vacated the beds—usually in October. Lift the plants with a good ball of soil attached, plant fairly firmly, and water in. Plants thus raised will not succumb except to very hard and long sustained frosts. Coddled plants soon die. Generally speaking, the double flowered varieties are rather more tender than the singles, and seedlings are preferably wintered in a cold frame.

A Selection of Varieties :—

Singles :—

Blood Red, 1′ to 1½′, reddish br.
Cloth of Gold, 1 , yel.
Eastern Queen, 1′, chamois, changing to salmon red; a distinct colour.
Golden Tom Thumb, 1′, yel.
Harbinger, 1½′, br.
Old Castle, 6″, yel.; excellent for walls, old ruins, dry banks, etc.
Ruby Gem, 1′, ruby vio.

There is also an early single annual Wallflower, which, if seed be sown under glass in March, will begin to flower in June and bloom till autumn. The flowers are brown and very fragrant. It is excellent for pot culture.

Doubles :—

Double German, 1½′, colours various, fragrant, like double Stocks. The following distinct colours can be obtained: yel., dark br., creamy wh., and vio. A packet of mixed seed will give them all. (*See also* CHEIRANTHUS.)

WALL GARDENS.

Much attention is now being paid to wall gardening, an interesting phase of the art which has for its object the decoration of walls by covering them with plants. When planting is properly carried out, these walls are not only exceedingly ornamental, but frequently afford a means of cultivating flowers which do not thrive satisfactorily upon the level ground. Most people are familiar with the pretty appearance of old walls on which such things as Wallflowers, Pinks, and Stonecrops have become established, or with some rough wall against an earthen bank, through which plants have grown, and veil the wall with foliage and flower. Old walls with crumbling mortar may be ornamented by scraping away some of the lime from the joints, inserting a little stiff soil, sowing seeds of suitable things in autumn or spring, and keeping the walls moist until the seedlings have become established; but quicker and better results are secured by fixing "pockets" of stone filled with soil on the face of the walls, in which plants may be placed. A still better plan is to build a double wall of rather rough stones, either without mortar or with plenty of spaces between the stones for the plants, and having the cavity between the walls filled with good soil. For a retaining wall to a bank, the latter may be cut away with a slight lean inwards, building the rough wall against it, so that the bottom of the wall is farther out than the top, and laying the stones with the outer edges slightly tilted upwards, so that the rain may enter at the joints. It is advisable to lay the stones the same way in a double wall, and some of the plants ought to be placed in position as the work proceeds, ramming the soil well in so as to leave no vacancies. To cover an existing wall with pockets, drive a stout spike nail into the joint of the wall immediately below the pocket, fix on this a flat stone, cementing it to the wall, lay on the edges of this stones fixed with cement to form the front and sides, and fill with good soil. Narrow stones on the top of the wall with soil between form a good site for other flowers. Watering the plants in wall gardens in dry weather needs to be attended to, but plants which can stand a good deal of drought should be selected. Sedums, encrusted Saxifrages, Pinks, dwarf Campanulas (such as portenschlagiana), Androsace anuginosa, Arabises, and Aubrietias are all very suitable for wall gardens.

WALLICHIA (*syns.* HARINA and WRIGHTIA of ROXBURGH).

Dwarf, stove Palms (*ord.* Palmæ). Propagation, by seeds sown in brisk heat, and by suckers from the parent plants. Soil, loam which has been stacked with cow manure four parts, leaf mould one part, and sand.

Principal Species :—

caryotoides, Jy., lvs. 3′ to 8′ long, leaflets 1′ to 1½′ long, jagged at the apex wh. beneath.
densiflora, 12′, plant stemless, lvs. wh. beneath.

Other Species :—

nana (now Didymosperma nanum).
porphyrocarpa (now Didymosperma porphyrocarpon).

WALLS.

Primarily the wall round the kitchen or fruit garden is for the purpose of protection, not only from undesirable visitors, who might make free with the crops within the enclosure, but also from cold and rough winds. As an aid to the proper cultivation of fruit, however, these boundary walls are of the highest importance. Wall-grown fruit compares favourably with that obtained in the open in earliness, appearance, and quality; and this being so it is manifest that every foot of wall space should be utilised in some way. Walls with a south aspect suit Apricots, Peaches, Nectarines, Pears, Figs, and the better class of Gage Plums. Plums and Pears do well on a west wall. Victoria Plums are excellent for one facing to the east. For the much abused north wall Morello Cherries, late Gooseberries, Currants, and dessert Plums are to be recommended.

In the south of England, Peaches, Nectarines, and Apricots will do even better upon a west wall than upon one facing south.

The height of these boundary walls varies considerably. For a garden of, say, 2 acres they should not be lower than 10′; 12′ will be better, and 14′ is not an uncommon height for large gardens. For small ones 8′ is a common height; 6′ is occasionally seen, but these low walls do not give the trees much room for extension. With regard to thickness, 9″ work is usual for walls up to 8′, 14″ work for those that are higher, and 18″ is preferred where great strength and durability are required. The thinner walls have in most cases to be buttressed to give them sufficient solidity. The coping should project at least 2½″ on each side, and if it is made of stone slabs so much the better. Specially moulded bricks are not uncommon.

As brick walls are great absorbers of sun heat, which they part with at night, it is only to be expected that wall trees are earlier in coming into bloom than others in the open. In some of the princely old-fashioned gardens attempts were made to artificially heat the walls by building them of great thickness and running flues through them in various directions. The heat was supplied by several fires in furnaces built into the wall. These heated walls have, however, fallen into disrepute. They were found to be expensive to build and keep up, and there was more than a doubt as to their efficiency.

Wallisia of Regel (*see Tillandsia*).
Wall Pennywort (*Cotyledon Umbilicus*).
Wall Pepper (*see Sedum acre*).
Wall Rue (*see Asplenium Ruta-muraria*).

It is an excellent plan to furnish fruit walls with glass copings projecting 8″ to 10″; the supports may be of wood or iron, preferably the latter. These copings not only give a good deal of shelter to the trees, but they are convenient for attaching tiffany and other coverings to in frosty weather when the trees are in bloom. If fixed glass copings are not convenient, movable wooden ones may be used.

The nailing of fruit trees to walls is gradually falling into desuetude; it knocks the walls about too much. Wiring is better. The wires may run horizontally or vertically; the former is better and more commonly practised.

Where insect pests are numerous it is a capital plan to undo the trees as far as possible in autumn and limewash the wall. A little sulphur may be added to the lime, and if the white is thought to be too glaring the wash may be darkened with soot. The time thus spent is generally well repaid.

Boundary walls, including those of sunk fences, and the containing walls of terraces in the flower garden, should never be allowed to remain bare, but should always be covered with climbers of some sort. There are many beautiful plants (*see* CLIMBERS and CREEPERS) available. There are also shrubby plants which, although not strictly climbers, can be made to adopt a sub-scandent habit, and many of these flourish better with the protection of a wall than they would do in the open.

WALUEWA.

The only species (*ord.* Orchidaceæ) is a small stove Orchid, of tufted habit, answering to the same treatment as that meted out to the Brazilian Miltonias.

Only Species :—

pulchella, Feb., yel., petals pur. banded, lip spotted pur.

WARDIAN CASE.

There are several different makes of Wardian case, but they may all be described as small glass structures, like miniature greenhouses, which can be closed up very tightly, so as to allow little exchange between their contained air and the external atmosphere. When employed, as they occasionally are, to convey delicate plants from their native countries to Britain, they are kept very close indeed. The pots containing the plants are plunged in Cocoanut fibre refuse, and kept in position by strips of wood, which are nailed or screwed into their places. The glass of the frame is fitted in with both top and bottom putty, and kept firm by narrow strips of wood, screwed in. Many delicate plants have thus made sea voyages, and with comparatively little injury, whereas if packed in the ordinary way they would have died.

Less close cases are in great favour for accommodating plants in dwelling rooms, and even in plant houses. Thus, Filmy Ferns may be enclosed in cases and grown in an ordinary greenhouse amongst other plants. Specially delicate and precious foliage plants are often enclosed in frames of this kind, especially when they are exhibited at flower shows. The case not only prevents touching by visitors, but also keeps the atmospheric conditions in which the plant is placed uniform.

When Wardian cases are employed in dwelling rooms they should be stood in a zinc or leaden tray, which may catch and hold the water. Cocoanut fibre and moss should not be used for plunging unless they are frequently changed, because they soon become sour and smell badly. Clean shingle is far better.

An adaptation of the Wardian case is frequently utilised for the windows of dwelling houses, and if properly attended to it is a very valuable adjunct. Almost any plants of dwarf habit may be grown in it; Ferns especially do well. It is a mistake, however, to mix flowering and foliage plants in the same case. They never do well together, for the former need the sun, while the latter generally like shade.

Various methods of filling these cases are available. The smaller hardy Alpines will do well if planted upon a miniature rockery placed inside. Where Ferns are favoured, some of the plants may be planted in mounds of soil placed in the bottom, and others may be put in pockets of cork hung against the sides. A favourite plan, and one to be recommended where a frequent change is desired, is to keep the cases filled with pot plants, which may be grown for the purpose in another house. There should always be holes in the bottom of the structure through which the drainage water may pass.

WARREA.

This small genus of Orchids (*ord.* Orchidaceæ) is chiefly represented in collections by the species tricolor. All are terrestrial plants, and need a stove temperature. The flowers are large and nearly round, the two lower sepals being bluntly spurred. (For culture, *see* PHAIUS.)

Principal Species and Variety :—

[NOTE.—s. = sepals, p. = petals, l. = lip.]

tricolor, sum., pseudo-bulbs 4″ to 5″ high, s. and p. wh., shaded yel., l. wh., marked yel., pur.

— stapelioides, s., p., and l. barred br.

Other Species :—

bidentata, has a longer and narrower l. than tricolor.

candida (now Zygopetalum candidum).

cyanea (now Aganisia cyanea).

digitata (now Zygopetalum wailesianum).

discolor (now Zygopetalum discolor).

WASHINGTONIA.

A genus of one species (*ord.* Palmæ) of tall and distinct-looking Palms, with white flowers, small, black fruits, and nearly round leaves, whose margins are hung with fine threads. Propagation, by seeds sown in heat. Soil, loam three parts, leaf mould one part, and sand.

Only Species :—

filifera, 20′ to 40′, grh., lvs. with thready margins (*syns.* robusta, Brahea filamentosa, Pritchardia filamentosa, and P. filifera).

robusta (*see* filifera).

WASPS.

Among the stinging Hymenoptera the species best known in the United Kingdom is the Common British Wasp (Vespa vulgaris). In appearance the wasps differ from bees in being less hairy, more slender, and having a more distinctive colouring—*i.e.* alternating bands of yellow and black. They differ also in habit, as they do not collect honey; and, with the exception of a few fertile females—queen wasps—they do not survive our winters. These queen wasps, after fertilisation

Walnut (*see Juglans*).
Warszewiczella (*see Zygopetalum*).

in the autumn, seek shelter, and remain torpid until stimulated by the warmth of spring, though sometimes a specially bright winter's day arouses them.

The first business of the awakened queen is to seek or make a suitable hole in the ground wherein to form a nest. With some wood scrapings as a foundation, she erects two or three layers of cells, lays an egg in each, and roofs the whole over. Then more cells are made and eggs laid, and as fast as the earlier eggs hatch the cell walls are added to, in order to keep pace with the growth of the grubs. Not only does the queen act as builder and mother, but she has also meanwhile to forage for the grubs, and when in search of food often steals honey from bees. Presently the grubs turn into worker wasps, and then the queen's work is lightened; but she continues to lay eggs, and from those laid in early autumn perfect male and female insects appear, which fly away from the old home and secure the continuity of the species. The males die, as do the worker wasps in the old nest, their course being now run.

The ovipositor of a wasp is also its sting; males have no sting.

In some districts wasps are very numerous in summer, and not only are they unpleasant neighbours, but they do a good deal of damage to Pears, Peaches, Nectarines, Grapes, and other fruits. Wide-mouthed bottles containing sugared beer, or a mixture of treacle and water, suspended in the trees bearing ripe fruit, act as traps, but in some cases it is necessary to keep the pests away from a crop by covering the trees, or the ventilators and doors in the case of Grapes, with thin canvas or scrim. Sweet traps in a house often attract wasps.

"Taking" a wasps' nest is one method of dealing wholesale destruction. This is done by marking the entrance with a stake during the day time, and in the evening plugging up the burrow with damp earth and turf, except for a small hole, through which a lighted squib of gunpowder and sulphur is pushed. Immediately after the explosion more wet earth is used to keep the powder and sulphur fumes from escaping; subsequently the nest may be dug out, and if the gardener be a disciple of Isaak Walton he will probably use some of the grubs for bait. Cyanide of potassium is likewise employed.

By far the best method of reducing the numbers of wasps is to carefully look out for and kill the queens in early spring, as every one accounted for means a whole colony the less during the summer and autumn.

WATER.

Water is formed by the combination of two gases, hydrogen and oxygen, in the proportions of two parts of the former, by volume, and one part of the latter. Calculated by weight, the proportions are sixteen parts of oxygen to two parts of hydrogen. The chemical formula is H_2O. When pure, water is tasteless, colourless, and without smell, but it has the power of attracting to itself and dissolving various minerals and gases, so that it is very rarely found pure. When, under the influence of frost, it becomes ice, it parts with most of these mineral substances—*e.g.* ice formed from salt water.

This property of dissolving mineral substances is of the greatest importance to the gardener, seeing that these minerals are in many cases part of the essential food of plants, and that the plants cannot take them until they are dissolved. Water thus becomes the vehicle which carries the supply of food to the plant. (*See also* ROOTS. For the movements of water in the plants, and details as to its subsequent expulsion, *see* SAP.) The presence of carbonic acid gas (CO_2) in water enables the latter to dissolve small quantities of phosphates of lime, as well as other compounds in which lime is a factor. Rain water usually contains a good deal of CO_2, as well as some oxygen, obtained from the atmosphere, together with small quantities of nitrates and ammonia from the same source. These are in addition to the various mineral substances which are in suspension in the atmosphere, and which it collects during its passage.

Rain water is preferred by gardeners to that coming from other sources, as it is found to exercise a more beneficial effect upon the plants than other and "harder" waters. The reason for this is to be sought in the gases dissolved in it, and also in the fact that it is heated to about the same temperature as the atmosphere in which the plants are growing. This is where outdoor plants are concerned. The temperature of water is a most important point. In dealing with under-glass plants the water should be of the same temperature as that of the house; it is a mistake to apply it when cold, for it seriously lowers the temperature of the soil, and causes a check to the roots, perhaps at a time when the latter are working at pressure to supply the needs of the top growth.

Cold water is bad, but cold and hard water is worse. Something may be done with naturally hard water by allowing it to remain exposed to the air in tanks and open reservoirs for a lengthened period, but even then it is not so good as rain water. Orchid growers generally contrive to keep up a supply of soft water by catching the rain as it falls from the houses, and conducting it into tanks to be stored for use. A favourite plan is to have the large tank underneath the floor of the house, the water being dipped up, or pumped into a smaller cistern at a higher level. A hot-water pipe running through the tank is an excellent addition; with it there need be no fear as to the temperature of the water.

It is safe to say, however, that much valuable rain water is wasted, and also that much might be done to economise the water obtained from the clouds. On some estates a system of dew ponds has been found to work well, and the writer has in mind at least one establishment where a constant supply of soft water is obtained by this method where formerly little was to be had. In making these dew ponds, advantage is taken of any slight natural hollow that may exist, so as to reduce the labour of digging. The holes are dug basin shape, with a central depth of about 5′. The bottom is puddled with plastic clay to which a little lime has been added to toughen it. After puddling, the bottom of the pond to be is thatched with straw to prevent cracks being made by the sun, and subsequent leakage.

Although rain is the source of supply for all springs and wells, the water obtained from them varies a good deal. Very hard water—*i.e.* that containing a great deal of carbonate of lime—is not good for plants. Also it should not be used for filling boilers and pipes, for the carbonate is deposited as a fur, clogging up the system. Iron compounds are often dissolved in water, and when this is the case the liquid is not always suitable for giving to plants.

For manure water, *see* LIQUID MANURE.

The fertility of a soil depends to a very great degree upon the presence of water in it. Stagnant moisture is injurious, and the soils in which it is to be found—usually clayey in composition, or situated in low-lying districts—are cold, unkindly, and sometimes absolutely unable to sustain crops of vegetables or fruit. Such soils may be helped by draining. (*See* DRAINAGE.) On the other hand, light, shallow soils that soon parch are assisted by irrigation, and by the addition of humus to the soil, the humus acting mechanically as a water holder. One of the great advantages of cow manure is that it contains great quantities of water; hence its suitability for applying to soils of a shallow nature.

WATER CRESS (*see* CRESS and NASTURTIUM).

WATERFALL.

Various methods whereby the ornamental qualities of water may be turned to account have been referred to in parts of this work. The waterfall is one of the most effective of them all. In some estates natural waterfalls occur, and although these may sometimes be scarcely improvable, their effectiveness may usually be enhanced in a variety of ways. Much may be done by the judicious clothing of the sides with Ferns and sub-aquatic plants which Nature has not already supplied. The deepening of a pool here, or the removal of a slight obstruction there, although simple in themselves, may be great improvements. The clearing of the channel will also react favourably upon the clearness of the water. Where a series of ornamental ponds is present, situated at different levels, it is an excellent idea to connect them by means of miniature waterfalls, the results being that the water is kept from stagnation, increased opportunities for growing sub-aquatic plants are obtained, and an agreeable feature is added to the grounds. In outdoor rockeries of any size it is usual to include a small waterfall. Where a large quantity of water is not obtainable, or not desired, it suffices to have a little trickling over the stones, and dripping slowly into a pool below. Similar waterfalls are to be seen in large under-glass rockeries and ferneries where the Ferns are planted out instead of being grown in pots. They are always much admired, and might well be extensively copied, seeing that such artificial waterfalls are not difficult to construct. The main thing is a constant supply of water, and this, unfortunately, is not always at command.

WATERING.

Without careful watering success in gardening is not attainable. To be able to tell when a plant needs water, and to supply it at once, are two chief items in the cultural routine, whether of plants in pots or in the open ground. Deciduous subjects need very little water in winter, as is easily understood when the fact is grasped that the organs of transpiration are no longer there. Even evergreen plants need only a lessened supply. Many bulbs, of which Tulips, Hyacinths, and Freesias are familiar examples, receive no water at all for a certain part of the year; they do not need it.

Pot Plants.—If a plant has been properly potted, enough room will have been left between the surface of the soil and the level of the pot brim to hold sufficient water to soak the ball. In such cases watering is easy, one application being generally sufficient. Where potting has been improperly performed, and the pot filled too full, the plant must be gone over twice or thrice. Giving water in driblets is disastrous. The surface soil only is wetted, the lower strata are dry, and the roots in them are perishing, yet the owner of the plant is fondly supposing that all is well. The usual method of finding out whether a pot plant needs water is by rapping with the knuckles. If the sound given out be hollow, water is wanted; if the sound be dull and heavy, the plant is wet enough. With some hard-wooded plants, notably Heaths, this system does not answer. The only plan is to lift the pots in the hand. With practice, it can be told immediately by the weight whether water is required or not.

Outdoor Plants.—The watering of lawns, bedding plants, herbaceous borders, and even trees and shrubs, will keep the outside staff busy in dry seasons. Here also the common practice of watering in driblets must be condemned. The temperature of the soil is lowered thereby, the roots are drawn to the surface, the soil becomes "baked," and the roots with it, and many of the latter perish. All well appointed gardens are supplied with hoses and sprinklers, in addition to plenty of water cans. The hose should, however, be employed wherever possible, and the cans only where the hose will not reach. Watering plants overhead in the middle of hot, bright days will sometimes result in scorching of the foliage, but scorching is not nearly so frequently caused by this as is generally supposed, or we should find it more prevalent when we get, as we often do, alternate spells of showers and bright sunshine. The lowering of the temperature that results from overhead watering is a stronger reason to urge against it than the fear of scorching.

WATERING ENGINES.

These include all kinds of force pumps, of which numbers of different makes are employed to supply water to gardens and glasshouses. A very ingenious lawn sprinkler is, however, commonly spoken of as a watering engine. It consists of lengths of metal piping perforated along their whole length, and mounted upon low wheels for greater ease of locomotion. The lengths may be joined to each other by short pieces of hose pipe, so that coupling and uncoupling are speedily performed. The apparatus is attached to the garden hose, and the number of lengths of the perforated piping used will depend upon the water pressure. The last length of the sprinkler will, of course, have a closed end. The water is ejected with great force from the perforations, and forms a rather coarse spray. The sprinkler may be kept at work by night as well as day, as no

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Water Aloe (*see Stratiotes aloides*).
Water Archer (*see Sagittaria sagittifolia*).
Water Ash, Carolina (*Fraxinus caroliniana*).
Water Avens (*Geum rivale*).
Water Bean (*see Nelumbium*).
Water Betony (*see Scrophularia*).
Water Caltrops (*see Trapa natans*).
Water Elder (*see Viburnum Opulus*).
Water Elm (*see Zelkowa*).
Water Flag (*see Iris Pseudacorus*).
Water Gladiole (*see Butomus umbellatus*).

danger of sun burning is to be feared. When the turf within reach of the spray has been thoroughly watered it is easy to move the sprinkler to a fresh spot. A contrivance of this kind is commonly in use at Kew during the summer months.

WATERING POTS.

Of late years the garden hose has become so popular that the work done by the time honoured water pot is not nearly so heavy as it used to be. Still, a selection of watering pots, in various sizes, must be considered an essential item in the collection of garden tools. For carrying, pots holding from 3 to 4 gallons are quite large enough. Larger than this they are clumsy, and their great weight when full rather hinders than expedites the work. All pots should be fitted with a detachable rose, but the holes of this often require to be made larger than they are left by the manufacturer before it is fit for use. Small pots, holding from 2 quarts to 1 gallon, are employed for watering pot plants. It is usual to have two roses with each of these, one a coarse and the other a fine one for watering seeds and seedlings. Occasionally an extra length of tubing to affix to the spout is found to be very useful when watering plants on shelves. For watering Strawberries, which are always close to the glass, a rather shallow pot is favoured, and if it has no cross handle, but only the D shaped handle at the back, it is easier to manage. Galvanised iron pots are used more now than formerly; they are found to be durable, but are, as a rule, rather heavy. Red or green painted pots are the most common; they are generally fitted with a cross handle at the top, a D shaped handle at the back, and the spout is strengthened by stays. The rose may be either slipped on or screwed; the former is the usual plan. Copper cans with the handle at the back continued over the top in the same line, not across, are to be seen sometimes, but they are expensive. The pattern—a French one—is, however, handy, and when galvanised iron is employed the cost is considerably reduced.

The life of a water can is considerably lengthened if, after it has been used, it is turned upside down to drain dry. In some gardens special racks are provided for the cans. An occasional coat of paint is helpful.

The "high level watering pot" is a name sometimes given to Haw's Patent can, which is deservedly in great favour with gardeners and nurserymen. The body of the can is rather shallow, and terminates in an open, oval neck. The spout is long, with a mainstay that serves as a handle for carrying, and the rose is a flattened affair, slightly convex on the upper side where the perforations are. The result of this flattened rose, with the holes looking upward, is that the water is forced upwards, describes a graceful parabola, and descends in a fine and gentle spray upon the plants. Roses with perforations of various sizes are supplied. Without the rose the can is very handy for watering pot plants, much more so, in fact, than the older cross-handled make, which it is rapidly superseding.

Photo: Cassell & Company, Ltd.

WATER LILIES IN THE LAKE AT GUNNERSBURY HOUSE, ACTON. FOR NOTES ON SPECIES AND CULTURE, *see* NYMPHÆA.

WATER LILY (*see* NYMPHÆA).

WATSONIA (*syns.* MERIANA and NEUBERIA. BUGLE LILY.)

About fifteen species of bulbous plants (*ord.* Irideæ) needing a greenhouse temperature. The plants are easy to grow, and several of them are very handsome decorative subjects. Meriana Ardernei (M. O'Brieni by the *Kew Hand-List*) is probably the best known of all. Propagation is by offsets, removed while the bulbs are at rest; and by seeds, sown in gentle heat. Soil, two parts of sandy loam and one part of peat. When planted in prepared borders in pits or frames the bulbs flower much more strongly than they do when in pots.

Principal Species and Varieties :—

coccinea, My., sc. (*syn.* Meriana coccinea).
densiflora, Je., rosy red, in a dense spike, lvs. 1½′ to 2′ long, strongly ribbed.
Meriana, My., pur. or sc. (*syn.* Antholyza Meriana).
— Ardernei (*see* var. O'Brieni).
— O'Brieni, 2′ to 4′, sum., wh.
rosea, 2′, Jy., ro. (*syn.* Gladiolus pyramidatus).

Other Species :—

aletroides, 1′ to 2′, Je., sc. (*syn.* tubulosa).
angusta, Je., sc. (*syns.* iridifolia fulgens, fulgida of Salis., and Antholyza fulgens).
brevifolia, 9″ to 15″, My., sc. (*syn.* Antholyza spicata).
fulgida (*see* angusta).
humilis, 8″ to 12″, Je., ro.
iridifolia fulgens (*see* angusta).
marginata, 2′, Jy., pk. Minor is a pretty var.
plantaginea (now Micranthus plantagineus).
punctata, 4″ to 15″, Je., sc. or vio. (*syn.* Ixia punctata).
tubulosa (*see* aletroides).

WEBERA.

This genus (*ord.* Rubiaceæ) of stove trees and shrubs is now referred to Tarenna by *Index Kewensis*, but it is still kept up in the *Kew Hand-List*. The only species worth mention is corymbosa, which may be multiplied by cuttings, and thrives in a compost of equal parts of loam and peat.

Principal Species :—

corymbosa, sum., wh., a small tree, slightly fragrant.

Water Leaf (*Passiflora laurifolia*).
Water Lentils (*see Lemna*).
Water Lettuce (*see Pistia*).
Water Lily, New Zealand (*see Ranunculus Lyallii*).
Water Locust Tree (*Gleditschia monosperma*).
Water Melon (*see Citrullus vulgaris*).
Water Milfoil (*see Myriophyllum*).
Water Oak (*see Quercus nigra*).
Water Parsnip (*see Sium*).
Water Plants (*see Aquatics*).
Water Reed (*see Arundo*).
Water Soldier (*see Stratiotes aloides*).
Water Violet (*see Hottonia palustris*).
Water White Oak (*Quercus lyrata*).
Water Dammer (*Podocarpus neriifolia*).
Wattle (*see Acacia and Citharexylum*).
Waxflower (*see Hoya*).
Waxflower, Clustered (*see Stephanotis floribunda*).
Wax Myrtle (*see Myrica cerifera*).
Wax Palm (*Copernicia cerifera*).
Wax Plant (*see Cerinthe major*).
Way Bread (*see Plantago*).
Wayfaring Tree (*Viburnum Lantana*).
Webbia (*see Vernonia*).

WEDELIA.

Stove, greenhouse, or hardy, annual or perennial herbs or sub-shrubs (*ord.* Compositæ), of interest chiefly to the botanist. Propagation, hispida by seeds and divisions, radiosa by seeds and cuttings.

Principal Species :—

hispida, 1½′, Je., hlf-hdy. per., yel.
radiosa, 2′, Je., grh. sub-shr., yel.

WEED DESTROYERS.

There are several excellent weed destroyers upon the market, and where there is a great length of paths to be kept clean, and hands are few, it will be found true economy to enlist the services of one of them. One good dressing early in the season will keep the paths in fairly good condition for the rest of the year, provided a little hand-weeding is done occasionally. As these liquid destroyers do not possess discriminating powers, it is very important that they should be kept off the grass verges; in fact, it will be advisable not to sprinkle them within 6″ of the grass edge. Also all the utensils used for applying the weed killer should be kept apart, and not used for anything else. Tender pot plants have been killed by water applied through pots which have been previously used thus.

Common agricultural salt makes a fairly good weed destroyer, and it may be sprinkled upon walks that are very weedy; but if the latter are shaded with trees the salt should not be used, for it tends to make the paths damp, and after a time the weeds grow faster than ever.

WEEDS.

The keeping down of weeds is a heavy item in the labour bill of the garden, yet it is evident that if the crops are to be given a fair chance weeds must not be allowed in any numbers. They not only rob the cultivated plants of a good deal of their legitimate food, but they prevent the proper aëration of the soil, and hinder nitrification, as well as give the garden an untidy appearance. Moreover, the presence of certain weeds indicates a condition of the soil that is not at all favourable to healthy growth; thus a waterlogged, stagnant medium is almost always demonstrated by quantities of Horse-tail (Equisetum arvense). Colt's-foot not infrequently has the same significance, and the presence of Chickweed may be commonly associated with soil poverty.

Amongst other common weeds Couch Grass, Bindweed, Dandelions, Daisies, Shepherd's Purse, Plantains, and Thistles are the most difficult to get rid of. Where the weeds have running rhizomes, as in the notorious Couch, there is nothing for it but thorough winter cultivation, this being followed by persistent spring and summer hoeing. The same applies to Bindweed. Hand-weeding plays an important part, but it must not be practised in wet weather on heavy ground, or more harm than good will result. Gravel paths may be kept in trim by an occasional hand-weeding, special weeding knives with short, stout blades being employed. If they have been neglected and allowed to get very bad, a weed destroyer must be made use of, or the old gravel removed and fresh material substituted.

Weed-wind or With-wind (*see Convolvulus arvensis*).

WEEVIL.

The popular name of Weevil is given to a large section of beetles (Rhynchophora) which have the head formed into a beak, with the mouth at the extremity. This beak is usually flattened, but in the Nut Weevil it is very long, slender, and curved. The antennæ of most of the weevils are elbowed, and the body is round and hard. The larvæ are, in most cases, white, fleshy grubs with horny heads and powerful jaws; most of them are harmful, living in fruits, seeds, between the epidermis of leaves, and in the interior of shoots. The beetles themselves, or weevils proper, are also destructive. The following is a list of the best known and most troublesome weevils. Further details will be found under the headings of ANTHONOMUS, OTIORHYNCHUS, and RHYNCHITES, or under the crops they infest.

Anthonomus Pomorum. Apple Blossom Weevil.
— Rubi. Raspberry Weevil.
Balaninus Nucum. Nut Weevil.
Otiorhynchus Ligustici. Vines. Heaths.
— picipes. Clay-coloured Vine Weevil.
— sulcatus. Black Vine or Furrowed Weevil.
— tenebricosus. Apricot Weevil.
Rhynchites Betuleti, various garden plants.
— cæruleus, fruit trees.
— cupreus. Plums. Copper-coloured Weevil.

The popular name is in most cases a guide to the plants attacked, but Otiorhynchus sulcatus attacks Peaches, Nectarines, Strawberries, and many pot plants, as well as Vines; picipes troubles Raspberries as well as Vines; and tenebricosus does not restrict its investigations to Apricots, but pays attention to Raspberries, Nectarines, and Peaches in addition.

WEIGELA (*see* DIERVILLA).

WEINMANNIA (*syn.* LEIOSPERMUM).

Stove or greenhouse trees and shrubs (*ord.* Saxifrageæ). Propagation, by cuttings in sandy soil in a close case in heat. Soil, any light, rich medium. The Weinmannias are of little garden value.

Principal Species:—

hirta, 6′ to 8′, My., st. tree or shr., wh.
ovata, 6′, My., grh. tree, wh.
trichosperma, 4′, My., st. shr.

WELDENIA (*syn.* LAMPRA).

The only species, candida (*ord.* Commelinaceæ), is a greenhouse shrub with tuberous roots, allied to Zebrina, and rarely, if ever, grown. It has white flowers in April.

WELFIA.

A small genus (*ord* Palmæ) of unarmed Palms, requiring a stove temperature. The flowers are pale yellowish white, the fruits black and oblong, and the leaves deeply cut (pinnatisect). Probably regia is the only species known to gardeners in this country. It may be propagated by imported seeds sown in heat as for other stove Palms, and likes a compost of three parts of turfy loam which has been stacked with cow manure, and one part of leaf mould, with sand.

Principal Species:—

regia, 60′, lvs. 20′ long when mature, wh. beneath. When young the lvs. are bronze grn., and are bilobate.

WELLINGTONIA (*see* SEQUOIA).

WELSH ONION.

This (Allium fistulosum) is an herbaceous perennial, with long and fibrous roots. It does not produce bulbs at any period of its existence. The two varieties, Red and Green, are grown for their leaves, which have the pungent properties of Alliums generally. Seeds and root division are both available for getting a stock of plants.

WELWITSCHIA.

The only species in this genus (*ord.* Gnetaceæ), mirabilis, is one of the most remarkable members of the vegetable kingdom. It may be likened to a huge wooden Mushroom, ornamented with a fringe of leathery, flattened thongs. The leaves, which last for many years, become split into fine segments by the action of the wind, and these flog the air in all directions. The plant affects the arid districts of tropical and south-western Africa, where rain seldom falls. One or two plants have been sent to Kew, but it is difficult to imitate the arid conditions under which it is found in a state of nature. A minimum temperature of 50° would be necessary, with a soil chiefly composed of sand and brick rubble, as well as a free exposure to sun.

WENDLANDIA.

Stove and greenhouse shrubs and dwarf trees (*ord.* Rubiaceæ), with white, pink, or yellow flowers, not commonly grown. Propagation, by cuttings in sandy soil in bottom heat. Soil, loam and peat in equal proportions, with sand.

Principal Species:—

paniculata, 6′, Jy., st., wh.
tinctoria, 6′, Jy., st., wh.

WERNERIA.

Low-growing perennial herbs (*ord.* Compositæ). Propagation, by division of the roots. The soil should be light and rich. A frame suits the plants best.

Principal Species:—

rigida, 9″, Feb., yel.

WESTRINGIA.

Greenhouse shrubs (*ord.* Labiatæ). Propagation, by cuttings of the young shoots in sand in a close

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Weeping Arbor-Vitæ (*see Thuya orientalis pendula*).
Weeping Ash (*see Fraxinus excelsior pendula*).
Weeping Beech (*see Fagus sylvatica pendula*).
Weeping Cherry (*see Prunus Mahaleb pendula, P. Padus pendula, etc.*).
Weeping Elm (*Ulmus glabra pendula and U. montana pendula*).
Weeping Mountain Ash (*Pyrus Aucuparia pendula*).
Weeping Oak (*Quercus pedunculata pendula*).
Weeping Poplar (*Populus grandidentata pendula and P. tremula pendula*).
Weeping Red Cedar (*Juniperus virginiana pendula*).
Weeping Willow (*see Salix babylonica*).

Welsh Nut (*Juglans regia*).
Welsh Poppy (*see Meconopsis cambrica*).

case, with gentle heat. Any light and rich soil will do.

Principal Species :—

rosmariniformis, 2′ to 3′, Jy., grh., pale bl., lvs. in whorls of four, silvery beneath (*syn.* rosmarinacea). Victorian Rosemary.
triphylla, 2′, Mch., wh.

Other Species :—

angustifolia (*see* rigida).
cinerea (*see* rigida var.).
Dampieri, 2′ to 4′, Sep., grh., wh.
eremicola, 3′, Je., pale bl. (*syn.* longifolia of *Botanical Reyister* 1481).
longifolia, 2′ to 3′, sum., lil.
rigida, 3′, wh. (*syn.* angustifolia).
— cinerea, more hoary.

WHEAT.

The ancestor of this all-important cereal has received the name of Triticum vulgare. It is extremely problematical, however, whether the original Wheat plant is in existence. It will be noticed that the Wheat is a close relative of that plague of the kitchen garden, Couch Grass, Cooch, or Twitch, Agropyrum (Triticum) repens. The Buckwheat is Fagopyrum esculentum, and the Guinea or Turkey Wheat, Zea Mays.

WHITE FLY.

In addition to being known as Black-tailed Mealy Bug, White-tailed Mealy Bug, and Lantana Bug, Orthezia insignis is sometimes called by the distinctly inappropriate name of White Fly. The Snowy Fly (Aleyrodes) is sometimes known as White Fly, and here the name is certainly suitable. A. Vaporariorum attacks plants under glass, and A. proletella Cabbages. (For other details, *see* ALEYRODES and SNOWY FLY.)

WHITEHEADIA.

A genus of one species (*ord.* Liliaceæ) of greenhouse bulbous plants. Propagation, by offsets. Soil, fibrous loam three parts, leaf mould and decomposed manure one part each, with coarse sand.

Westeria (*see Wistaria*).
Western Yew (*Taxus baccata brevifolia*).
West Indian Cockspur (*Pisonia aculeata*).
West Indian Mugwort (*Parthenium Hysterophorus*).
West Wind, Flower of the (*see Zephyranthes*).
Weymouth Pine (*see Pinus Strobus*).
Whanger Cane (*see Phyllostachys nigra*).
Wheat, Buck (*Fagopyrum esculentum*).
Wheat, Guinea or Turkey (*see Maize and Zea Mays*).
Whin (*see Ulex*).
Whin Berry (*Vaccinium Myrtillus*).
Whin, Petty (*Genista anglica*).
White Arum Lily (*see Richardia africana*).
White Ash (*see Fraxinus americana*).
White Basswood, American (*see Tilia heterophylla*).
White Beam Tree (*see Pyrus Aria*).
White Bladder Flower (*see Aranjia*).
White Bothen (*see Chrysanthemum Leucanthemum*).
White Bottle (*Silene inflata*).
White Butterwood (*Trichilia spondioides*).
White Cedar (*see Cupressus, Thuya gigantea and T. occidentalis*).
White Cypress (*see Taxodium distichum*).
White Elm (*see Ulmus americana*).

Only Species :—

latifolia. 1½″, Ap., grn. (*syns.* bifolia, Eucomis bifolia of *Botanical Magazine* 480, and Melanthium massoniæfolium).

WHITE-LINE DART MOTH.

This is the popular name given to Agrotis Tritici, a member of the section of Noctua, or Night Moths. The larvæ are almost omnivorous, but they are especially fond of the young and tender shoots of the Grape Vine. They attack most strongly the shoots which are nearest to the ground, eating by night and hiding in the soil during the day. Hand picking by lantern light is generally recommended, but the larvæ are difficult of detection. Where herbaceous plants are concerned it is advisable, if the attack be a bad one, to remove the surface soil with the larvæ and burn it, replacing it by fresh material.

WHITFIELDIA.

Ornamental stove herbs (*ord.* Acanthaceæ), only one species of which has been introduced. Propagation, by cuttings. Soil, fibrous loam two parts, peat one part, and sand.

Only Species Introduced :—

lateritia, 3′, aut., win., red.

WHITLAVIA (*see* PHACELIA).

WIDDRINGTONIA. (AFRICAN CYPRESS.)

Greenhouse or half-hardy trees (*ord.* Coniferæ). Propagation, by seeds. The young plants should be carefully pricked into larger pots as soon as possible. Soil, light sandy loam two-thirds, and leaf mould one-third. The genus is referred to Callitris by *Index Kewensis*.

Only Species :—

cupressoides, 10′ to 15′, cones ovate.
juniperoides, 10′ to 30′, cones smaller, three or four together.
Whytei, only a few feet high in this country, 140′ or more in its native habitat., lvs. glaucous, handsome for grh. (*see p.* 444).

WIGANDIA.

Tall, hairy, stove and greenhouse perennial herbs (*ord* Hydrophyllaceæ). Their fine foliage and bold appearance adapt them for summer bedding. Propagation, by seeds in heat in early spring, and by cuttings. Soil, rich, sandy loam.

White Gum (*Eucalyptus Leucoxylon*).
White-heart Hickory (*Carya tomentosa*).
White Hellebore (*see Veratrum*).
White Lime (*Tilia argentea*).
White Pine (*Pinus flexilis*).
White Potherb (*Valerianella olitoria*).
White Root (*Polygonatum multiflorum*).
White Thorn (*see Cratægus Oxycantha*).
White Tree (*Melaleuca Leucadendron*).
White Truffle (*see Truffles*).
White Vine (*see Clematis Vitalba*).
White Water Lily (*see Nymphæa alba*).
White Wood (*see Liriodendron tulipifera and Tilia americana*).
Whitleya (*see Scopolia*).
Whitlow Grass (*see Draba and Paronychia*).
Whitten Tree (*see Viburnum Opulus*).
Whitwort (*see Pyrethrum Parthenium*).
Whortleberry (*Vaccinium Myrtillus*).
Wig Tree (*see Rhus Cotinus*).

Photo: Cassell & Company, Ltd.

WIDDRINGTONIA WHYTEI (*see p.* 443).

Principal Species :—

caracassana, 10′, Ap., lil. (*syn.* macrophylla).
urens, 6′, aut., calyx woolly, petals vio. bl.
Vigieri, 6′, aut., lil. bl.

WIKSTRŒMIA.

Greenhouse deciduous shrubs (*ord.* Thymelæaceæ). Propagation, by cuttings. Soil, peat and loam, both fibrous, in equal parts.

Principal Species :—

Alberti, 2′, sum., yel. (*syn.* Stellera Alberti).
viridiflora, 6′, sum., grn. (*syn.* indica).

WILLEMETIA.

Greenhouse shrubs (*ord.* Rhamneæ), propagated by cuttings in heat, and thriving in peat, loam, and sand.

Principal Species :—

africana, 10′, My., wh. (*syn.* Noltia africana).

WILLESDEN CANVAS.

This canvas, like the paper of the same name, possesses great tensile strength, is watertight and durable. It may be put to the same uses as the Willesden Paper, which *see*.

WILLESDEN PAPER.

This is a special kind of paper, of considerable toughness, and so treated that it is quite watertight. Several qualities are obtainable. The "stout brown" is made in rolls about 4½′ wide; it may be turned to good account for protective purposes. Handy screens may be made with it, and, if not subjected to such violence as to tear them, these screens will last for a long time. The lighter samples of paper are sometimes used to pack plants in, especially where they have to travel long distances. Waterproof labels have likewise been made from this paper, but, although they have given satisfaction, they are not often seen.

WILLOW (*see* SALIX).

WILLOW SAWFLIES.

Of all the plants liable to the attacks of Sawflies few are more plagued than the Willows. Thus, of British insects upwards of thirty species of Nematus and twenty species belonging to various other genera feed upon species of Salix, and this does not take into account plants upon the Continent. The mischief may be brought about in one of several ways. Some of the larvæ simply eat the leaves, others act as leaf miners, and others cause the formation of galls. Nematus gallicola is the most common of the gall makers, and it is to be seen on Salix alba, Lapponum, nigricans, and phylicifolia, to mention only a few. The so-called Bean Galls are very plentiful. The Pea Galls are chiefly the work of Nematus Pedunculi. As a rule the health of the affected trees does not suffer unless the galls are very numerous, and in that case there is nothing for it but excision of the affected branches. Where there are many of the larvæ the trees may be shaken to dislodge them, and the caterpillars may then be swept up and burned, or left to the tender mercies of domestic fowls. Hand-picking may be practised for small trees; it is out of the question for large ones. Applications of soot, lime, and gas lime to the soil beneath the trees, although not sufficient to get rid of the pests entirely, are yet helpful.

WILLUGHBEIA (*syn.* ANCYLOCLADUS).

Stove climbing shrubs (*ord.* Apocynaceæ), few of which are in cultivation. Propagation, by cuttings of nearly ripened shoots. Soil, fibrous peat and loam in equal parts, with sand.

Principal Species :—

edulis, 50′, Jy., cl., pale pk., lvs. 4″ to 7″ long, fruits edible, as large as a Lemon.

WINDOW BOXES.

As with the plants that are grown in windows, inside the room, so with those that are accommodated in boxes outside on the sills—much depends upon whether the window be a sunny or a shaded one. There is the difference, however, that the occupants of the window boxes are not, as a rule, permanently established in them. Still, if anything like lasting effects are desired, only Ferns and green foliage plants should be attempted in shaded windows. If flowering plants are employed they will need to be frequently renewed during the season, with the single exception of the showy shrubby Calceolarias, which do well in shade.

With regard to the boxes themselves, the most expensive ones are made of stone, more or less elaborately carved, or of china tiles of various patterns. Handsome as these are, it cannot be urged that they are more suitable for the plants than the less expensive but very effective rustic boxes now coming so much into fashion. On the whole, the most satisfactory window boxes are made of wood, and faced with sheets of virgin cork. If made of stout stuff—inch boards answer well—they will last for several years without repairs. Then a little overhauling annually will keep them in service for several years more. This, of course, applies to boxes that are only allowed to remain out during the summer months—that is, from the end of May to the end of September. The life of a box that has to remain exposed to the weather all through the year will of necessity be rather shorter.

One of two systems may be adopted for filling the box. The plants may be planted out in it, or they may be grown in pots and stood in the boxes when they are in condition. This latter method has the

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Wikstrœmia of Schrader (*see Laplacea*).
Wild Apple (*see Pyrus Malus*).
Wild Bergamot (*Monarda fistulosa*).
Wild Clary (*Salvia Verbenaca*).
Wild Clove (*Pimenta acris*).
Wild Date (*see Phœnix sylvestris*).
Wild Hyacinth (*Scilla festalis*).
Wild Irishman (*Discaria Toumatou*).
Wild Olive (*see Olea europœa and Elæagnus*).
Wild Spaniard (*see Aciphylla*).
Wild Snowball (*Ceanothus americanus*).
Wild Water Lemon (*Passiflora fœtida*).
Wild William (*see Lychnis Flos-Cuculi*).
Willow, American Water (*Dianthera americana*).
Willow-herb, French or Persian (*see Epilobium angustifolium*).
Willow Grass (*Polygonum amphibium*).
Willow Herb (*see Epilobium*).
Willow, Kilmarnock Weeping (*Salix Caprea pendula*).
Willow, Weeping (*see Salix babylonica*).
Wind Flower (*see Gentiana Pneumonanthe and Anemone*).
Window-bearing Orchid (*see Cryptophoranthus*).

advantage that it permits of frequent changes being made in the arrangements, and for that reason is to be recommended for town house windows. Against it is to be urged that it involves a good deal of extra trouble, especially in watering.

Where the plants are to be planted out the drainage must be perfect, and once a year the old soil must be taken out and replaced by new. A mixture of two parts loam, one part leaf soil, and about a twelfth sand will be found to answer. About 1″ of space should be left between the surface of the soil and the top of the sides, so as to facilitate the giving of water.

If the aspect be very windy, and the window-sills rather sloping and none too broad, it will be well to fasten the box securely in its place.

A box of fair width will hold three rows of plants. It is usual to put the tallest of these at the back, the next in the middle, and have a front row of trailers to hang over the sides. Individual taste will suggest modifications of this arrangement.

After the tender occupants have gone, the windows may be embellished during the winter by dwarf Conifers, Tree Ivies, Euonymuses, Hollies, both green and variegated, and, if desired, various spring-flowering bulbs may be planted between these.

In spring, Hyacinths, Tulips, and Scillas are all available, and many showy colour combinations may be worked out. In the summer Begonias, Zonal and Ivy-leaved Geraniums, Fuchsias, yellow and white Marguerites (Paris Daisies), Heliotropes, Nasturtiums, Petunias, and Musks are commonly made use of. The pretty little Fairy Roses also do well if grown in pots in readiness. The appearance of the window is much improved if a fringe of greenery can be taken round it, and there is nothing better for the purpose than the popular Virginian Creeper. Tropæolum majus may be used in the same way, but not against red brick-work; it is much too garish.

WINDOW GARDENING.

The growing of plants in windows has long been a popular pastime, and yet it is probable that the failures are as numerous as the successes. The reason is not far to seek. It lies in neglecting to choose suitable subjects for the windows. It is of little use to put Ferns in the full blaze of the sun in a south window, or Zonal Geraniums and Fuchsias in a north window, and wonder why they do not grow properly. Again, it is to be feared that sufficient care is not taken in shielding the plants from draughts and from sudden fluctuations of temperature, while the watering problem is ever recurrent. If only ordinary attention is paid to these points, it is possible to grow many pretty plants in the window of a dwelling room, in spite of the rather arid conditions that too often prevail.

For a south or a west window the following are a few subjects that may be relied upon: Begonias, of the tuberous, Rex, and semperflorens types; Calceolarias (herbaceous and shrubby), Campanula isophylla, i. alba, and Mayi; Cytisuses (Genistas), Fuchsias, Geraniums, both Zonal and scented-leaved; Heliotropes, Musk, both Mimulus moschatus and Harrison's large-flowered variety; Myrtles, Pelargoniums, both Show and Regal; Phyllocactuses in variety, and Sedums. In the spring it is possible to have in bloom, and with very little trouble, Crocuses and Hyacinths, grown both in soil and water; Freesias, and Lachenalias. Most of these will thrive moderately well in an east window, but with the lesser amount of sun they will naturally not be so fine.

In a north window it is useless to expect flowering plants to thrive, so that the window gardener is obliged to choose from among such plants as the well-known Aspidistra, Araucaria excelsa, Fatsia japonica (Aralia Sieboldii), Ficus elastica, F. e. variegata, and such Palms as Howea (Kentia) belmoreana, H. forsteriana, and Cocos weddeliana; the latter, although a stove plant, is one of the best room plants in existence. Amongst the Ferns available may be noted Asplenium bulbiferum and its varieties, and the crested forms of Polypodium vulgare and Scolopendrium vulgare. Adiantum cuneatum is a great favourite among window gardeners, but it is unfortunate that it is but a qualified success, one season frequently being enough for it.

A few hanging baskets are a capital addition. The baskets themselves may be made of wood or wire, or hanging pots may be utilised. There are several contrivances upon the market that enable ordinary pots to be slung up. Of the subjects suitable for these baskets in a sunny window tuberous Begonias, the trailing Campanulas before referred to, Nepeta Glechoma variegata, and Linaria Cymbalaria may be mentioned.

So far the subjects dealt with may be made more or less permanent occupants of the window. There are a few that are only bought in to stand while they are in flower. The beautiful Erica hyemalis is a case in point. It is very seldom that the sojourn in the window does not kill it. And there are many other plants in like case.

With regard to treatment, window plants are subject to the same rules as those laid down for ordinary greenhouse subjects, except that the hints as to the giving of water and air should be even more closely followed. Dust should not be permitted to rest upon the leaves of foliage plants, but the sponge and syringe must be continuously applied in summer, with an occasional sponging at other times. During spells of sharp frost the plants should be taken out of the window and stood in the middle of the room; there will then be less danger of their being nipped.

It is impossible to give window plants strong-smelling fertilisers, but that does not mean that they are to have no manurial help at all. A choice should be made among the less odorous chemical manures, and it will be found that Clay's fertiliser, for one, has very little objectionable smell. If the window is opened, weather permitting, for an hour or so after the fertiliser has been applied, all smell will disappear.

WINTER CHERRY (*see* PHYSALIS ALKEKENGI and SOLANUM CAPSICASTRUM).

Wind-root (*see Asclepias tuberosa*).
Wind Rose (*Rœmeria hybrida*).
Wine Berry (*Vaccinium Myrtillus*).
Wine Berry, Japanese (*see Rubus phœnicolasius*).
Wine Palm (*Caryota urens and Phœnix sylvestris*).
Wintera (*see Drimys*).
Winter Aconite (*see Eranthis hyemalis*).
Winter Berry (*see Ilex*).

WINTER GARDEN.

A cool plant house of considerably larger dimensions than the ordinary conservatory is generally dignified by the title of winter garden. Such a structure should be beautiful from an architectural point of view, and in keeping with the mansion to which it is attached. Sometimes the winter garden is not connected with a mansion, and when this is the case the designer has more scope, and not infrequently takes so great an advantage of his opportunities that the result is a structure of elegant appearance, but quite unsuitable for the cultivation of plants. If plants cannot be grown in a winter garden the structure does not justify its existence.

The internal arrangement of a winter garden may differ considerably from that of a conservatory, indeed, it should look like a garden under glass, and not merely a place for the display of pot plants cultivated elsewhere. There should be broad paths, beds planted with fine examples of trees and shrubs from the warmer temperate regions, and one or more spaces where a party of people might take afternoon tea amid beautiful surroundings, or in the case of a public winter garden, a space for a small band and the listeners.

Suitable plants must be selected or failure will assuredly follow. Those requiring a high temperature and moist atmosphere must be tabooed. Remembering that it is during late autumn, winter, and early spring that the winter garden is most popular, affording welcome shelter and genial warmth, planters should rely mostly upon evergreen subjects, such as Acacias, Araucarias, Camellias, Eucalyptuses, Himalayan Rhododendrons, Proteas, Indian Azaleas, and Bamboos, with a few Palms, notably Trachycarpus excelsa, T. martiana, Phœnix dactylifera, P. humilis, P. reclinata, P. rupicola, Jubæa spectabilis, Chamærops humilis, Livistona chinensis, Rhapis flabelliformis, and R. humilis. Ferns of many kinds should find a place, especially Dicksonia antarctica, Cyathea dealbata, C. medullaris, Brainea insignis, Lomaria procera, Aspidium falcatum, Pteris umbrosa, P. serrulata varieties, P. tremula varieties, Platycerium alcicorne (in baskets or on blocks), Polypodium juglandifolium, P. vulgare varieties, Scolopendrium vulgare varieties, Woodwardia radicans, Gleichenia circinata, G. c. Mendelii, G. c. Speluncæ, G. dicarpa varieties, G. flabellata, Nephrodium molle, N. m. corymbiferum, Nephrolepis cordifolia pectinata (in baskets), Todea barbara, and T. Fraseri. There are many others.

The beds for the permanent subjects must be well drained, and have a good depth of broken bricks and potsherds in the bottom, this being covered with turves ere the soil is put in. A peaty soil suits the majority of subjects, but it is easy to arrange the plants together in accordance with their likes so far as soil is concerned. If strong, well-grown specimens are planted, a winter garden soon looks furnished. The introduction of water, alone or in combination with rocks and bog, always forms an attractive feature in a large house. Aponogeton distachyon should always find a place in the little pond, as it will flower throughout the winter.

To enter into the details of design and planting and selection of subjects for a winter garden would occupy more space than can be spared in a work of this kind, and this note must conclude with a brief reference to overhead furnishing. Plants in baskets should have their place, and be suspended well out of the reach of people passing beneath them. Whether flowering or foliage plants are used they should be light, graceful, and more or less drooping. For training to the roof there is ample material to select from, but Semele androgyna, Acacia riceana, Asparagus plumosus, A. retrofractus, A. scandens, and Tea-scented Roses ought not to be omitted. Passifloras, Tacsonias, Cobœas, and Hibbertia dentata are also useful.

WINTER MOTH (*see* Apple Enemies).

WIREWORMS.

Because of their toughness and appearance, the grubs of most species of Agriotes (or Elater), a genus of beetles, are known as Wireworms. The beetles are commonly referred to as Skipjacks, or Click Beetles, but both these titles are used in connection with other genera than that under notice. Wireworms are voracious feeders, and do much damage to root crops, to Carnations, and to many subjects that have fleshy or thickened roots, or rhizomes. The species found most destructive are A. lineatus, A. obscurus, and A. sputator, all of which feed near the surface, but remain concealed in the soil, so that often the first indication of their presence is the collapse of the plants attacked. In the perfect beetle stage the species are not destructive to plants

Many are the remedies that have been advocated for wireworms, but in all cases the unfortunate gardener whose land is infested must be persistent, and exercise patience. Gas lime, fresh from the works, liberally applied and lightly pointed in, is a famous remedy. If, in addition, the land so dressed is not cropped for a year, any wireworms escaping the gas lime will be starved out. Where the wireworms attack a valuable crop the application of nitrogenous fertilisers, such as nitrate of soda, and soot, will not only assist the plants, but be distasteful to the pests. In gardens, and especially those of small size, traps made of hollowed halves of Potatoes, pieces of Turnip, Carrot or Parsnip, each with a wooden skewer attached, may be effectively used. The material should be buried 1″ or so, leaving the skewer standing well out of the ground. A daily examination of the traps, and destruction of the wireworms caught, will soon reduce the pest.

WISTARIA (*syn.* Wisteria. Grape-flower Vine).

Handsome, hardy, deciduous climbing shrubs (*ord.* Leguminosæ). Propagation, by layers of young shoots, which should remain one year before being detached. Soil, rich, sandy loam. Wistarias in the young state are very slow growing.

Winter Bloom (*see Hamamelis virginica*).
Winter Clover (*Mitchella repens*).
Winter Cress (*see Barbarea and American Cress*).
Winter Daffodil (*see Sternbergia lutea*).
Winter Green (*see Pyrola*).
Winter Green, Aromatic or Creeping (*see Gaultheria procumbens*).
Winter Green, Chickweed (*see Trientalis*).
Winter Hawthorn (*see Aponogeton distachyon*).
Winter Sweet (*see Origanum*).
Winter Wolf's Bane (*see Eranthis hyemalis*).
Wistaria, Tuberous-rooted (*see Apios tuberosa*).

The shoots may be spurred back on large plants. Wistarias may also be grown in pots for forcing.

Principal Species and Varieties : –

chinensis, rambler, My., Je., mauve (*syns.* sinensis and Glycine chinensis or sinensis). Chinese Kidney Bean Tree.
— alba, wh., sweet.
— flore pleno, double.
— macrobotrys, wh., bl., pur.
— variegata, lvs. variegated.
multijuga, sum., lil. pur., very long racemes (*syn.* grandiflora).
sinensis (*see* chinensis).

Other Species and Varieties :—

brachybotrys, 5′, Ap., vio. pur.
frutescens, 10′, Ap., My., shr. (*syns.* Glycine frutescens).
— alba, wh.
— backhousiana, vio.
— magnifica, bl., spotted yel.
— purpurea, vio. pur.
japonica, Jy., Aug., shr., wh. (*syn.* Milletia japonica).

WITCH KNOTS or WITCHES' BROOMS.

Curious-looking bundles of twigs, resembling loosely built rooks' nests, that are to be seen occasionally on Beech, Birch, Bullace, and Hornbeam trees. Upon examination, the twigs are seen to be swollen and distorted, and the leaves they bear are of a sickly yellow green. The popular names of Witch Knots and Witches' Brooms are probably due to local attempts to ascribe the formation of these clusters to some uncanny agency. Search has revealed that they are brought about in some trees by low Fungi (Ascomycetes), and in others by the action of Gall Mites (Phytopti). The so-called true Witch Knots are, however, due to Fungi. Thus, Exoascus turgidus affects the Birch, E. Carpini the Hornbeam, and E. Insititiæ the Bullace. Other species, or modifications of these, are to be found on Poplars, Alders, Elms, and Cherries, producing distorted leaves. Abies pectinata, the Silver Fir, occasionally bears a Witch Knot. This arises from a swelling of the central stem, or one of the larger branches, and from this tumour a number of short, brittle branches proceed, the "needles" being short, swollen, and bright green in colour. As in the case of deciduous trees, therefore, the Witch Knot is easy of discernment. Æcidium elatinum is the name of the Fungus which produces this condition of things in the Silver Fir.

With regard to remedies, the excision of the affected parts is the only treatment; but, although the presence of Witch Knots indicates a pathological condition, the tree, beyond being a little stunted in growth, does not seem to suffer much. All parts cut out should be burned, to prevent the spreading of the spores.

WITLOEF, or WITLOOF.

Under this title a strong growing variety of Cichorium Intybus is cultivated largely in France and Belgium, and to a lesser degree in this country, for salads. The forced and blanched stems and leaves are eaten. (For methods of culture and forcing, *see* CHICORY.)

Witch Elm (*Ulmus glabra montana*).
Witches' Thimble (*see Silene maritima*).
Witch Hazel (*see Hamamelis*).
Withe Rod, American (*Viburnum nudum*).
Withy (*Salix fragilis*).
Woad, Dyer's (*Isatis tinctoria*).
Woad, Waxen (*Genista tinctoria*).
Woad, Wild (*Reseda Luteola*).

WITSENIA.

Ornamental, evergreen greenhouse plants (*ord.* Irideæ). Propagation, by seeds, division and cuttings. Soil, sandy peat and loam, in equal parts.

Only Species :—

corymbosa, 3′, Je., pale bl. (correctly Aristea corymbosa).
maura, 4′, Dec., bl., blk., br.

WITTSTEINIA.

Greenhouse shrubs (*ord.* Vacciniaceæ), of prostrate habit. Culture as for Erica (which *see*). The only species is vacciniacea, 6″, autumn, red or greenish yel.

WOOD ASHES.

Pure wood ashes, as well as the remains of quickly burned clippings of garden refuse, are valuable to the gardener by reason of their fertilising properties. They contain from four to eight, or even nine, per cent. of potash, and from one to two per cent. of phosphoric acid. Wood ashes can scarcely be wrongly used in the garden, but they are of the greatest value for Leguminous crops, lawns, and Potatoes. It is not, however, easy to obtain pure wood ashes, except in the neighbourhood of woods and forests, consequently gardeners now largely use Kainit when a potassic manure is required. Crops that are liable to have their leaves attacked and crippled by insects may be preserved from their enemies by occasional dustings with wood ashes early in the morning. Turnips especially benefit from such applications. Wood ashes have also another value; they absorb ammonia, and may thus be utilised for surfacing beds of fermenting manure, and for mixing with urine.

WOODFORDIA.

Stove shrubs (*ord.* Lythrarieæ). Propagation, by cuttings in sandy peat, beneath a bell-glass, over bottom heat. Soil, loam and peat in equal parts, with sand.

Only Species :—

floribunda, 3′. My., sc. (*syns.* tomentosa, Grislea tomentosa of *Botanical Magazine* 1906, and Lythrum fruticosum).

WOODLICE.

These little scavengers, known also as Wood Bugs and Slaters, are well known by reason of their greyish colour, and the habit they have of rolling themselves into a ball when alarmed. To the Cucumber and Mushroom grower woodlice (Oniscus Armadillo) are great pests, as they soon render the produce unsaleable, but where Cucumbers are grown in houses on trellises the fruits

Wolf Berry (*Symphoricarpus occidentalis*).
Wolf Chop (*Mesembryanthemum lupinum*).
Wolf's Bane (*see Aconitum*).
Wolf's Bane, Winter (*see Eranthis*).
Wolf's Claw (*Lycopodium clavatum.*)
Wolf's Milk (*see Euphorbia*).
Wollastonia (*see Wedelia*).
Woman's Cap Orchid (*see Thelymitra*).
Woodbine (*see Lonicera Periclymenum*).
Woodbine, American (*see Ampelopsis quinquefolia*).
Wood Fern (*see Polypodium vulgare*).
Wood Lily (*see Pyrola and Trillium*).

are out of harm's way. Old manure beds have great attractions for woodlice, and they also frequent decaying wood, bark, and rubbish heaps; in short, wherever decaying vegetation is found in the garden or greenhouse, provided it is not too wet, there the woodlice congregate in fulfilment of their mission. Hence, cleanliness is by far the best remedy, and should be especially enforced in Orchid houses, Cucumber and Melon pits, forcing pits, and wherever there are succulent fruits, vegetables, or flower spikes that might attract them. A dirty board laid beneath the hot-water pipes will soon be used as a shelter by woodlice, and form a trap, as also will a few dirty pots, especially if partly filled with dry but dirty moss. Gas lime and boiling water are remedies wherever it is possible to use them without injury to plants.

WOODSIA.

Hardy or cool greenhouse Ferns (*ord.* Filices), that thrive admirably in the rockery or Fern garden. Propagation, by spores and division. They are hardy except where otherwise stated.

Principal Species :—

glabella, 6″.
ilvensis, 4″.
obtusa, 6″ to 12″, grh.
oregana, 6″.
polystichoides, 9″, grh.; several vars.
scopulina, 8″.

WOODWARDIA.

Strong-growing Ferns that succeed in a cool greenhouse, and will thrive out of doors in sheltered positions in the southern counties. They are of great beauty, and as the fronds are fairly tough, their effect is not easily spoiled. Radicans makes a grand basket Fern for a conservatory or winter garden, but it needs a large receptacle; while areolata is a fine species for planting near water in similar structures. Propagation is by spores, division, and the removal of the plantlets that form on the fronds of some species. Soil, good fibrous loam and peat in equal parts, with sand.

Principal Species and Variety :—

areolata, 9″ to 18″, fertile fronds rich br. (*syn.* angustifolia).
Harlandii, 9″ to 20″.
japonica, 1½′ to 2½′, fronds very broad in proportion to their length.
orientalis, 3′ to 10′, erect, proliferous.
radicans, 3″ to 10″, arching, proliferous.
— Brownii, all the pinnæ crested (*syn.* r. cristata).
virginica, 1½′ to 3′, pinnæ deeply lobed.

WORMIA (*syn.* LENIDIA).

Stove evergreen trees (*ord.* Dilleniaceæ). Propagation, by cuttings of half-ripened shoots in a close case. Soil, fibrous loam two parts, peat one part, and sand.

Principal Species :—

Burbidgei, 10′, Jy., golden yel.
triquetra, 20′, My., wh. (*syn.* dentata).

WORMS.

The earthworms, all of which belong to the genus Lumbricus, have a great part to play in fields and gardens. In some respects they are beneficial, and in others they are distinctly injurious. Taking the former side of their mission first, it is manifest that boring in the soil as they do they must assist in its aëration to a considerable degree. Moreover, they feed on decaying vegetable matter, and with it they take in a great deal of earth, which they get rid of at the surface in the form of "castings." In this way they set up a constant interchange between the various strata of soils; in fact, estimates have been made of the number of years which it takes for the whole of the soil to pass through them.

With regard to the objectionable side, there is no doubt that worms, especially the large lobworms, do damage to young and tender seedlings, either by feeding upon them or disturbing the young roots by their burrows. On lawns, too, the castings are a great nuisance if they are present in any quantity. Before setting the mowing machine to work a stiff broom should be passed over the lawn to break up and distribute these casts, or clogging of the machine will result. A dry day should be chosen. To get rid of worms from a lawn, apply clear lime water in the evening, and pick up the stupefied worms in the morning. Starlings, hedgehogs, and shrew mice all prey upon worms.

Pot plants are sometimes troubled with worms, and if the latter are not soon got rid of, the health of the plants is seriously endangered. As a rule, the worms get in when, as in the case of Chrysanthemums, the pots are stood upon the ground. Instead of this the plants should be placed upon a layer of sharp ashes, or upon boards, slates, or tiles. Worm excluders are sometimes used, but they have not come greatly into favour. As with the lawn, watering with clear lime water is the remedy.

WORMWOOD.

This hardy perennial (Artemisia Absinthium, *ord.* Compositæ) is sometimes grown for the medicinal value of its leaves and young shoots, which have very bitter properties. Propagation is by seeds, cuttings, and root division, the last-named being conducted in spring. Almost any garden soil will suit, provided it is well drained. The situation should be dry and, if possible, sheltered. (For further particulars, *see* ARTEMISIA.)

WRIGHTIA. (PALAY or IVORY TREE.)

Stove trees or shrubs (*ord.* Apocynaceæ). Propagation, by cuttings in a close case. Soil, fibrous loam two parts, peat one part, and sand.

Principal Species :

coccinea, 20′, Jy., dark red (*syn.* Nerium coccineum).
dubia, Je., or. red.
pubescens, Mch., wh.
tinctoria, sum., wh. Pala Indigo Plant.

WULFENIA.

Hardy perennial herbs (*ord.* Scrophularineæ). Propagation, by seeds and division. Soil, light loam two parts, and leaf mould one part, in a moist but well drained position in the rockery or border. Some protection is needed to prevent rotting in the winter.

Principal Species :—

amherstiana, 5″ to 10″, Jy., bl.
carinthiaca, 1′ to 2′, Jy., bl.

Wood Nut (*see Corylus and Nuts*).
Wood Laurel (*see Daphne Laureola*).
Woodruff or Woodrowel (*see Asperula*).
Wood Sorrel (*see Oxalis Acetosella*).
Wood Tongue Fern (*see Drymoglossum*).
Wood Violet (*see Viola sylvatica*).
Woody Nightshade (*see Solanum Dulcamara*).
Woollen (*see Verbascum*).
Woolly Aphis (*see American Blight*).

Wormwood (*see Artemisia*).
Woundwort (*Anthyllis Vulneraria*).
Wreathewort, Purple (*see Orchis mascula*).

WULFFIA (*syns.* CHATIAKELLA, CHYLODIA, and TILESIA).

Stove perennial herbs (*ord.* Compositæ). Propagation, by seeds and division. Soil, light sandy loam. Stenoglossa, 3′, June, orange yellow (*syn.* maculata), is the only species introduced.

WURMBEA.

Greenhouse bulbs (*ord.* Liliaceæ). Propagation, by seeds and offsets. Soil, loam and sandy peat in equal parts.

XANTHOCEPHALUM (*syn.* XANTHOCOMA).

Greenhouse and hardy annual and perennial herbs and sub-shrubs (*ord.* Compositæ). Propagation, by seeds and cuttings. Soil, light sandy loam, in a sunny position.

Principal Species :—

centauroides, 18″, Jy., grh. sub-shr., yel. (*syn.* Grindelia coronopifolia).
gymnospermoides, 4′, Aug., hdy. ann.,or. yel. (*syn.* Gutierrezia gymnospermoides of *Botanical Magazine* 5155).

XANTHOSOMA LINDENI (*see p.* 451).

Principal Species and Varieties :—

capensis, 6″ to 12″, My., Je., lil. (*syn.* campanulata).
— longiflora, longer flowers, more robust.
— longiflora pumila, dwarf, fewer flowers.
— purpurea, lurid pur.

WYETHIA (*syns.* ALARÇONIA and MELARHIZA).

Hardy perennial herbs (*ord.* Compositæ). Propagation, by seeds. Soil, light loam.

Principal Species :—

angustifolia, 10″ to 24″, aut., yel.

XANTHISMA (*syn.* CENTAURIDIUM).

Texanum (*syn.* Drummondii) is a hardy annual or biennial herb (*ord.* Compositæ). It grows 2′ high, and has yellow flowers in summer. Propagation, by seeds sown in the open in April. Any good garden soil will do.

XANTHIUM. (CLOT BUR and COCKLE BUR.)

Hardy annual and perennial herbs (*ord.* Compositæ), of no horticultural merit.

Wych Elm (*Ulmus glabra and montana*).
Wymot (*see Althæa*).

XANTHOCERAS.

Sorbifolia, 5′ to 15′, July, white, with red spots, the only species in this genus (*ord.* Sapindaceæ) is a small hardy or half-hardy tree. Propagation, by seeds or root cuttings. Soil, light sandy loam, in a sheltered position.

XANTHORRHŒA. (BLACK BOY, GRASS TREE.)

Greenhouse, slow-growing shrubs (*ord.* Juncaceæ). Several species furnish a yellow, resinous gum. Propagation, by seeds and offsets. Soil, loam, a little peat, and sand.

Principal Species :—

arborea, 4′, Ap. Botany Bay Gum.
australis, 2′, sum.
bracteata, sum., lvs. 2′ long.
hastilis, lvs. 4′ long, stem very short.
minor, lvs. 2′ long, stem short and thick.
Preissii, 10′, lvs. 4′ long.
quadrangulata, 4′, lvs. 1½′ long.

XANTHOSIA.

Greenhouse herbs and low-growing shrubs (*ord.* Umbelliferæ), frequently clothed with long, soft hairs. Probably only about two species have been

introduced, and they are not common. Propagation, by seeds, sown in heat in spring. Soil, loam and peat in equal parts, with sand.

Principal Species :—

pilosa, 1′ to 2′, Je., procumbent shr., wh. (*syns.* hirsuta and montana).
rotundifolia, 1′ to 2′, Je., herb, wh.

XANTHOSOMA.

Evergreen, stove, perennial herbs (*ord.* Aroideæ). Propagation, by cuttings of the stem in a close case, with strong bottom heat. Soil, rich fibrous loam two parts, peat one part, with charcoal and sand.

Principal Species and Variety :—

Barilleti, lvs. palmate, on a stalk 3′ long.
Lindeni, lvs. spear shaped, 1′ long, veins wh. (*syn.* Phyllotænium Lindeni; *see* p. 450).
— magnificum, larger lvs. (*syn.* Phyllotænium Lindeni magnificum).
sagittifolium, 3′, spathe grn., wh. Arrow-leaved Spoonflower.
violaceum, spathe vio., yel., wh.
Wallisi, lvs. spear-shaped, veins wh.

XERANTHEMUM (*syn.* XEROLOMA. IMMORTELLE).

Hardy, erect, mostly white leaved annuals (*ord.* Compositæ). Propagation, by seeds in spring or autumn. Soil, rich sandy loam, in a shady position. (*See also* HELICHRYSUM and EVERLASTINGS.)

Principal Species :—

annuum, 2′, Jy., pur.
inapertum, 2′, Je., wh. (*syn.* erectum).

XERONEMA (*syn.* SCLERONEMA).

Moorei, 18″, bright crimson (*ord.* Liliaceæ), the only species is a stove perennial. Propagation, by seeds or division. Soil, loam and peat or leaf soil in equal parts, with sand.

XEROPHYLLUM.

A hardy perennial (*ord.* Liliaceæ). Propagation, by seeds and division. Soil, moist peat and loam. The plant may be treated as a sub-aquatic.

Principal Species :—

asphodeloides, 2′, My., wh. (*syn.* Helonias asphodeloides).

XEROTES (*syn.* LOMANDRA).

Greenhouse perennial rigid herbs (*ord.* Juncaceæ). Propagation, by division. Soil, loam and peat in equal parts, with sand.

Principal Species :—

longifolia, 3′, Je., grn., wh., lvs. 1′ to 2′ long.
Australian Tussock Grass.
rigida, dwarf, Je., grn., wh., lvs. shorter.

XIMENIA.

Stove and greenhouse shrubs (*ord.* Olacineæ). Propagation, by cuttings. Soil, loam two parts, peat one part, and sand.

Principal Species :—

americana, 20′, Ap., st., wh., fruit edible. False Sandalwood, Hog, Mountain, and Seaside Plum.

XIPHIDIUM.

Stove and greenhouse perennial herbs (*ord.* Hæmodoraceæ) with small flowers; not of much garden value. Propagation, by division. Soil, sandy loam and peat.

Principal Species and Variety :—

floribundum, 2′, Je., wh. or pale bl. (*syn.* albidum).
— giganteum, lvs. broader.

XYLOBIUM.

Epiphytal Orchids (*ord.* Orchidaceæ) allied to Maxillaria, and thriving under the same cultural conditions. The plants are not favourites with Orchidists. An intermediate house or stove will suit all those named.

Principal Species :—

[NOTE.—s. = sepals, p. = petals, l. = lip.]

decolor, spr., s. and p. light yel., shaded wh., l. whitish.
elongatum, spr., s. and p. yel., wh., l. yel., br.
leontoglossum, wh., spr., yel., spotted maroon, l. fleshy.
squalens, spr., s. and p. yel., wh., streaked pur.; there is a good deal of pur. in the lip.

Other Species :—

Colleyi, reddish br., spotted pur. (*syn.* Maxillaria Colleyi).
concavum, 9″, pale yel. (*syn.* Maxillaria concava).
corrugatum, pallidiflorum, and scabrilinguis are at Kew, but they have little decorative value.

XYLOMELUM.

Greenhouse trees and shrubs (*ord.* Proteaceæ), few of which are in cultivation. Propagation, by seeds and cuttings. Soil, fibrous peat and loam in equal parts, with sand.

XYLOPIA. (BITTER WOOD.)

Stove evergreen trees and shrubs (*ord.* Anonaceæ). Propagation, by cuttings. Soil, loam, peat, charcoal, and sand.

Principal Species :—

æthiopica. Negro Pepper.
glabra, 20′, lvs. lance shaped, downy beneath.

XYRIS. (YELLOW-EYED GRASS.)

Rush-like stove, greenhouse, and hardy perennials (*ord.* Xrideæ). Propagation, by division. Soil, rich, sandy loam.

Principal Species :—

operculata, 18″, Je., st., yel., br.

YEW.

The Yew (Taxus baccata) occupies a very prominent position in song and legend. As a decorative tree its beauty is of too sombre a character to appeal to many, yet it has been extensively planted, and there are some fine old specimens scattered through the country. Geologically considered, the Yew is one of the oldest trees we have, and it also boasts a much longer life than the majority of our forest trees, being in this respect a very worthy rival of the Oak. The wood is exceedingly hard and close grained, elastic, and

Xanthorrhiza (*see Zanthorrhiza*).
Xanthoxylon (*see Zanthoxylum*).
Xarreria (*see Anemanopsis*).
Xeroloma (*see Xeranthemum*).
Xerophyta (*see Vellozia*).

Ximenesia (*see Verbesina*).
Xiphion (*see Iris*).
Xiphopteris (*see Polypodium*).
Xylophylla (*see Phyllanthus*).
Yacca Wood Tree (*Podocarpus purdieana*).
Yam (*see Dioscorea*).
Yang-mae Tree (*Myrica Nagi*).
Yarrow (*see Achillea*).
Yarrow, Soldier's (*see Stratiotes aloides*).
Yate or Yeit Tree (*Eucalyptus cornuta*).
Yellow Archangel (*Lamium Galeobdalon*).
Yellowby (*see Chrysanthemum segetum*).

durable, but it splits readily, and this, with the hardness, militates against its use as timber. Its elasticity stood it in good stead when the longbow was in request, and the good "Yew bow" was a necessary part of the household furniture. (For other particulars, *see* TAXUS.)

The Yew is not so frequently attacked by insect and fungoid pests as the majority of the Conifers. One of the gall midges (Cecidomyia Taxi) is often troublesome. The eggs are laid in the tips of the branchlets, the larvæ hatch, and the irritation they set up causes the formation of a gall not unlike a small cone in appearance. Unless these galls are very numerous they do not do much mischief, and they are so conspicuous upon small trees that they can easily be cut off and burned, with their contained larvæ. This excision must be done when the galls are young. The gall mite (Phytoptus Taxi) is a sterner foe. Its eggs are laid in the young buds as well as in the male and female flowers. These all swell, and take on a bright yellow or red hue. The gall mites live between the scales of the galls. As with the Big Bud in Black Currants, the only reliable remedy is to cut out and burn affected branches. Spraying is useless.

Photo: W. Rossiter, Bath.

A PAIR OF HANDSOME YEWS IN A BATH GARDEN.

Yellow Cress (*see Barbarea præcox and American Cress*).
Yellow Elder (*Tecoma stans*).
Yellow Everlasting Flower (*Helichrysum arenarium*).
Yellow Garden Hawkweed (*Tolpis barbata*).
Yellow Iris (*see Iris Pseudacorus*).
Yellow Larkspur (*see Tropæolum*).
Yellow Rattle (*Rhinanthus Crista-galli*).
Yellow Rocket (*Barbarea vulgaris*).
Yellow Root (*Hydrastis canadensis*).
Yellow Star Flower (*see Sternbergia lutea*).
Yellow Sultan (*see Centaurea odorata and Moschata*).
Yellow Water Lily (*see Nuphar luteum*).
Yellow Weed, Dyer's (*Reseda Luteola*).
Yellow Wood (*Cladrastis tinctoria, Ochrosia borbonica, and Podocarpus*).
Yellow-wort (*Chlora perfoliata*).

YUCCA. (ADAM'S NEEDLE, BEAR'S GRASS, SPANISH BAYONET.)

Description. — Stove, greenhouse, and hardy plants (*ord.* Liliaceæ), related to the Dracænas and the Cordylines. The hardy species, of which angustifolia, filamentosa, and gloriosa are notable examples, are plants of very distinct habit, and they, with their numerous varieties, are excellent subjects for forming isolated clumps upon the lawn. In corners of the rockery where succulent plants are collected they form fine additions, and the well-drained soil of the rockery is exactly to their liking. Gloriosa is a good town plant. The Yuccas are of comparatively slow growth, and most of them do not flower until they have reached a good age. The huge, erect panicle, with its pendulous flowers, is a great attraction, but seeds seldom ripen in this country. Filamentosa flowers freely when young.

Yew, Chinese (*see Podocarpus*).
Yew, Cluster-flowered (*see Cephalotaxus*).
Yew Gall and Mite (*see Yew*).

Propagation.—By suckers from, or divisions of, the old plants; also by means of cuttings of the fleshy roots, inserted in rather sandy soil in a close frame, with heat according to the character of the species or variety.

Soil.—A light, rather rich soil suits the Yuccas best. A good, sandy loam, with about one-fifth of its bulk mortar rubbish, and another fifth old Mushroom bed manure, is suitable. Heavy loam will need more of the mortar rubbish.

Other Cultural Points.—Drainage must in all cases be free, or the plants will rot. Where they are to be grown in the open ground it will be well to dig the beds 3′ and drain thoroughly. Pot plants should be potted firmly. The outdoor clumps benefit considerably by annual mulchings of rotted yard dung; pot plants may have liquid manure in the summer. With regard to the quantity of water needed, Yuccas come halfway between the Cacti and ordinary plants. In winter one watering will carry them on for weeks. Hardy species that are grown in pots, and stood in ornamental vases, may require to be taken indoors during long spells of frost, for the low temperature has a greater effect upon them when they are in pots than it has upon plants in the open ground.

Principal Species and Varieties:—

aloifolia, stem 15′ to 20′, My., Je., grh., wh., lvs 1′ to 1½′ long, 1″ to 1½″ broad, grn., with a reddish br. spine at the tip.
— Draconis, lvs. longer, more drooping.
— purpurea, dwarf, lvs. pur.
— quadricolor, lvs. tinged red.
— tenuifolia, lvs. very narrow.
— tricolor, lvs. wh.. grn., yel.
— variegata, lvs. striped wh.; a favourite in gardens.
Arcuata, Atkinsii, conspicua, and crenulata are other vars.

angustifolia, nearly stemless, Jy., hdy., wh., lvs. 1½′ to 2′ long, ¼″ broad.
— stricta, inflorescence more compound (*syn.* stricta of Sims).

filamentosa, nearly stemless, Je., hdy., wh., lvs. 1½′ to 2′ long, 1½″ to 2″ broad, margins filamentous. Silk Grass.
— flaccida, lvs. more slender than type, filaments on leaf margins stronger (*syn.* flaccida of Haw.).
— orchioides (*see* orchioides).
— variegata, variegated.
Other vars. are antwerpensis, concava, glaucescens, grandiflora, maxima, and puberula.

flexilis, stem short, sum., grh., wh., lvs. 2′ to 2½′ long, 1″ to 1½″ broad, spinous at the end, margins reddish br. (*syns.* acuminata, longifolia, mexicana, stenophylla, all of gardens).
— ensifolia, stems 4′ to 5′, flowers wh., red.
Concava, falcata, nobilis, and semi-cylindrica are other vars.

glauca, stemless, sum., hlf-hdy., wh., lvs. 1″ long, 1¼″ to 1½″ broad, glaucous when young.

gloriosa, stems 4′ to 6′, often branching, Jy., hdy., wh., flushed red, lvs. 1½′ to 3′ long, 2″ to 3″ broad, stiff, erect, glaucous, grn. Mound Lily.
— Ellacombei, nearly stemless (*syn.* Ellacombei).
— recurvifolia (*see* recurvifolia).
Other vars. are acuminata, medio-striata, minor, obliqua, plicata, pruinosa, superba, and tortulata.

guatemalensis, 15′ to 20′, sum., grh., wh., lvs. 2′ to 3′ long, 2″ to 3″ broad.

orchioides, sum., hdy., wh., lvs. 6″ to 9″ long, ⅛″ to ¾″ broad (*syn.* filamentosa orchioides).

recurvifolia, stem short, branching, sum., hdy., wh., lvs. 2′ to 3′ long, recurving (*syns.* japonica of gardens, pendula, recurva, and gloriosa recurvifolia).
— foliis-variegatis, lvs. with a central greenish red stripe.

treculeana, 20′ to 25′, branching, sum., grh., wh., lvs. 2½′ to 4½′ long, 2½″ to 3½″ broad. Canaliculata is a var.

Other Species and Varieties:—

acuminata (*see* gloriosa var.).

acutifolia, sum., hdy., wh., lvs. 2½′ long, stiff, sub-erect.

antwerpensis (*see* filamentosa var.).

arcuata (*see* aloifolia var.).

Atkinsii (*see* aloifolia var.).

baccata, 8′ to 10′, sometimes stemless, sum., hdy. or hlf-hdy., wh., fruits pur., lvs. 1½′ to 3′ long, 1″ to 2″ broad. Circinata, periculosa, and scabrifolia are vars.

Boerhaavii, grh., lvs. 2′ to 3′ long, ½″ to ¾″ broad.

canaliculata (*see* treculeana var.).

circinata (*see* baccata var.).

concava (*see* filamentosa var.).

desmetiana, grh., lvs. 1′ long, ½″ to ¾″ broad, grn.

Draconis (*see* aloifolia var.).

Ellacombei (*see* gloriosa var.).

exigua (*see* filamentosa).

filifera, trunk 50′ high, 2′ to 3′ through, sum., grh., wh., lvs. 1½′ long, 1″ to 1½″ broad, margins reddish br.

gigantea, 3′ to 4′, sum., grh., wh., lvs. 4′ to 5′ long, 3″ to 3½″ broad.

japonica of gardens (*see* recurvifolia).

macrocarpa, 1′ to 4′, close to baccata).

Peacockii, grh., lvs. channelled, with sharp points (*syn.* lævigata of gardens).

semi-cylindrica (*see* flexilis var.).

superba (*see* gloriosa var.).

tenuifolia (*see* aloifolia var.).

Whipplei, nearly stemless, sum., hdy., wh., grn., lvs. 1′ to 1½′ long, ½″ broad.

HYBRID YUCCAS.

Recently several new hybrid Yuccas have been introduced to commerce, and when more generally cultivated will add much to the favour being now shown to these effective plants. The following is a list of those at present in commerce. All are white unless otherwise stated.

albella, hdy.

elegantissima, hdy. (filamentosa major × gloriosa).

elmensis, hdy. (filamentosa major × gloriosa).

Guiglielmi, hdy., one of the finest.

Imperator, hdy., very fine (filamentosa major × recurvifolia).

liliacea, hdy. (filamentosa × rupestris).

magnifica, hdy. (filamentosa flaccida × gloriosa).

margaritacea, hdy. (filamentosa × gloriosa).

præcox, hdy., early bloomer.

Treleasii, hdy., early, large spikes and flowers.

viridiflora, hdy., large srikes of light green flowers.

ZACINTHA.

Verrucosa, the only species (*ord.* Compositæ), is a hardy annual, 6″ to 12″ high, with yellow flowers in summer. It is of little garden value. Increased by seeds in light, sandy loam.

ZALACCA (*syn.* SALACCA).

Dwarf, almost stemless, Palms (*ord.* Palmæ), seldom grown.

Principal Species:—

edulis, lvs. erect, clustered, divisions 2′ long, 2″ broad, wh. beneath, sharp prickles (*syns.* blumeana and wallichiana).

ZALUZANIA (*syn.* FERDINANDA, in part).

Stove, half-hardy, and hardy shrubs (*ord.* Compositæ). Propagation, by seeds and cuttings. Soil, light loam. Ferdinanda eminens (correctly Podachænium paniculatum), stove, white, is the only species in cultivation.

ZALUZIANSKIA (*syn.* NYCTERINIA).

Greenhouse and half-hardy annual and perennial herbs and sub-shrubs (*ord.* Scrophularineæ).

Propagation, by seeds, cuttings, and division. Soil, light, moist, sandy loam and peat.

Principal Species :—

capensis, 8″ to 12″, sum., hlf-hdy. ann., wh.
lychnidea, 1′, Jy., grh. sub-shr., yellowish wh. (*syns.* Erinus lychnideus and Nycterinia lychnidea).
selaginoides, 6″, My., hlf-hdy.ann.,wh.,or. centre, fragrant at night.

ZAMIA.

Stove and warm greenhouse, Palm-like plants (*ord.* Cycadaceæ), of slow growth and dwarf stature. Propagation, by seeds and offsets, occasionally by division. Soil, loam two parts, peat one part, and sand. (*See also* CYCAS.)

Principal Species and Variety :—

amplifolia (*see* Wallisii var.).
calocoma, dwarf, lvs. 3′ long,leaflets with eighty pairs (correctly Microcycas calocoma).
furfuracea, leaflets ten to thirteen pairs, leafstalks prickly. Jamaica Sago Tree.
Lindeni, lvs. 6′ long, leaflets with forty pairs, 8″ long; one of the best.
picta, lvs. spotted wh.; near muricata.
pseudo-parasitica, lvs. 6″ long (*syn.* Roëzlii).
Skinneri, 6′, lvs. 5′, leaflets very broad.
Wallisii, leaflets 1′ long, stalks reddish, prickly.
— amplifolia, leaflets yellowish grn., small prickles.

ZAMIOCULCAS (including GONATOPUS).

Stove herbaceous perennials with tuberous roots (*ord.* Aroideæ). Propagation, by division and by pegging the mature leaflets on to moist soil. Soil, loam two parts, leaf mould one part, with cow manure, charcoal, and sand. A decided rest must be given.

Only Species :—

Boivini, 3′, spathe yellowish grn. (*syn.* Gonatopus Boivini).
Loddigesii, 4′, Jy., spathe grn., spathix yellowish grn. (*syn.* Caladium zamiæfolium).

ZANNICHELLIA. (HORNED PONDWEED.)

Hardy annual and perennial aquatic herbs (*ord.* Naiadaceæ), of no garden value.

ZANTHORHIZA.

A dwarf hardy shrub (*ord.* Ranunculaceæ). Propagation, by suckers. Soil, moist loam.

Only Species :—

apiifolia, 3′, Ap., dark pur.

ZANTHOXYLUM (*syns.* PTEROTA and XANTHOXYLON. PRICKLY ASH, TOOTHACHE TREE.)

Stove, greenhouse, half-hardy, and hardy trees (*ord.* Rutaceæ). Propagation, by seeds. Soil, rich loam two parts, leaf mould one part, and sand.

Principal Species :—

alatum, 10′ to 20′, spr., greenish wh., prickly, flattened vertically to the trunk.
americanum, 20′, Ap., hdy. (*syns.* fraxineum and ramiflorum).
Clava-Herculis, 50′, Ap., st., grn.
nitidum, 30′, Je., grh. or hlf-hdy., grn.
piperitum, 10′, aut., wh. (*syn.* Fagara piperita). Chinese or Japanese Pepper.
Pterota, 10′, Aug., hlf-hdy., grn. Bastard Ironwood.

ZAUSCHNERIA.

A handsome, dwarf, half-hardy shrub (*ord.* Onagrarieæ). Propagation, by seeds, division, and cuttings. Young plants should be wintered in a cold frame. Soil, light, sandy loam. It grows well on rockwork and on walls, and is hardy if given a sunny, well-drained position.

Only Species and its Varieties :—

californica, 1′, sum., bright sc. Californian Fuchsia and Hummingbird's Trumpet.
— grandiflora, flowers brighter and larger.
— latifolia, lvs. broader, flowers dull red, smaller.

Zanonia (*see Alsomitra and Campelia*).

ZEA (*syn.* MAYS).

A half-hardy, tall-growing Grass (*ord.* Gramineæ), largely cultivated for the production of Maize, fodder, and also for its handsome appearance in the flower garden. (For culture and varieties, *see* MAIZE.)

ZEBRINA.

Stove and greenhouse trailing herbs (*ord.* Commelinaceæ). They are useful for baskets, edgings to stages, and covering unsightly places beneath stages. Propagation, by cuttings. Soil, light sandy loam.

Principal Species and Variety :—

pendula, sum., wh., lvs. striped wh. (*syns.* Cyanotis vittata,Z.tricolor, and Z. zebrina).
— tricolor, upper surface of lvs. grn., wh., red.

ZELKOWA (*syn.* ABELICEA. WATER ELM.

Hardy deciduous trees, closely resembling Elms (*ord.* Urticaceæ). Propagation, by seeds and grafting. Soil, rich loam.

Principal Species and Variety :—

acuminata, 40′, Ap., male flowers in racemes (*syns.* Z. Keaki, Planera acuminata, Ulmus Keaki, and U. monumentalis of gardens).
crenata, 80′, Ap., male flowers in bundles (*syns.* Abelicea ulmoides, Planera carpinifolia, crenata, Gmelini Richardi, Kaki, and Ulmus polygama). Siberian Elm.
— pendula, drooping branches.
Verschaffeltii, 30′, lvs. deeply toothed (*syns.* Z. japonica Verschaffeltii, and Ulmus Verschaffeltii).

ZENOBIA.

A showy, hardy shrub (*ord.* Ericaceæ). Propagation, by seeds and layers. Soil, sandy peat with plenty of moisture.

Only Species and Variety :—

speciosa, 4′, sum., wh., drooping (*syns.* Andromeda cassineæfolia, A. nitida of gardens, A. speciosa, and A. viridis).
— pulverulenta, lvs. waxy wh., more showy (*syns.* A. dealbata, A. speciosa glauca, and Lyonia pulverulenta).

ZEPHYRANTHES. (ZEPHYR FLOWER.)

Stove, greenhouse, and hardy bulbs (*ord.* Amaryllideæ). Propagation, by seeds and offsets. Soil, sandy loam and leaf mould, with good drainage. The stove and greenhouse species should be rested during winter.

Principal Species and Varieties :—

Andersoni, 7″, My., grh. or hlf-hdy., golden yel., red base (*syns.* Habranthus Andersoni). Aurea and cuprea have golden and coppery flowers.
Atamasco, 15″, My., hlf-hdy., whitish pk. (*syn.* Amaryllis Atamasco). Atamasco Lily.
candida, Sep., hdy., wh. (*syn.* Amaryllis candida). Peruvian Swamp Lily.
carinata, My.. grh., pk.; var. grandiflora has blush flowers.
macrosiphon, sum., rosy red.
rosea, My., hlf-hdy., ro.

Zapania (*see Lippia*).
Zebra Plant (*Calathea zebrina*).
Zehneria (*see Melothria*).

ZEUXINE. (Striped King of the Woods.)

Dwarf stove Orchids (*ord.* Orchidaceæ), few of which are in cultivation. Propagation, by division. Soil, fibrous peat and sphagnum. (*See also* Anœctochilus.)

Principal Species :—

regia, 5″, lvs. greenish wh. with pale lil. and wh. bands (*syns.* Haplochilus regium and Monochilus regium).

ZEUZERA. (Wood Leopard Moth.)

Zeuzera Æsculi is a handsome moth about 1½″ long, and has narrow, semi-transparent white wings with bluish black marks. The larvæ, yellowish white with black marks, feed on the wood of Apple, Pear, Plum, Elm, Chestnut, and Poplar Trees. Grease banding the trees, catching the moths, and killing the caterpillars in their burrows, are the best remedies.

ZEXMENIA.

Stove, greenhouse, and hardy annual and perennial herbs (*ord.* Compositæ), few of which are of garden value. Propagation, by seeds and cuttings. Soil, light, sandy loam.

Principal Species :—

aurea, 1½′, Sep., golden yel. (*syns.* Verbesina aurea and Wedelia aurea).
ovata, 2′, aut., hdy. ann., or. yel. (*syn.* Tithonia ovata).

ZIERIA. (Australian Turmeric Tree.)

Greenhouse trees (*ord.* Rutaceæ) of little garden value. Propagation, by cuttings of young shoots and by seeds. Soil, light, sandy loam.

Principal Species and Variety :—

Smithii, 10′, wh. (*syn.* lanceolata). Sandfly Bush and Tasmanian Stinkwood.
— macrophylla, larger (*syns.* arborescens and macrophylla).

ZILLA.

Half-hardy herbs (*ord.* Cruciferæ), of little horticultural value.

ZINGIBER.

Stove perennial herbs (*ord.* Scitamineæ), with tuberous rhizomes. The roots of officinale furnish the Ginger of commerce. Propagation, by division in a close case. Soil, rich loam, peat, and sand.

Principal Species :—

Cassumunar, 5′, Jy., pale yel., bracts red (*syn.* Cliffordiæ). Bengal Root.
officinale, Jy., yel., lip dark bl. Ginger.
Zerumbet, 4′, sum., sulphur. There is a variegated var.

ZINNIA (*syns.* Crassina and Lejica).

Half-hardy annual and perennial herbs and subshrubs (*ord.* Compositæ), of much value for summer and early autumn bedding. Propagation, by seeds in gentle heat in April. The plants, which must never become starved, should be gradually hardened off, and transferred to the beds in June. Most of the single and double varieties of gardens have sprung from elegans. Packets of mixed seed, or collections of separate colours, may be bought.

Principal Species and Varieties :—

elegans, 2′, sum., sc., crim., ro., buff, wh.; many vars., including verticillata.
multiflora, 2′, sum., sc., red, disc yel.
pauciflora, 2′, yel.
tenuiflora, 2′, sum., sc.
haageana, 1′, sum., or. yel.

Zichya (*see Kennedya*).

ZIZANIA. (Water, Canadian, and Indian Rice.)

Tall, hardy aquatic Grasses (*ord.* Gramineæ), of great beauty in shallow water. Propagation, by seeds, which must be kept in water during winter. They should be sown indoors, and the young plants kept inside till May. The young plants are best protected from frost. Birds and water fowl are very fond of the seed.

Principal Species :—

aquatica, 6′ to 8′, sum., grn., br. Water Oats. There is a dwarf var.

ZIZIPHORA.

Dwarf hardy annuals or perennial sub-shrubs (*ord.* Labiatæ). Propagation, by seeds and cuttings. Ordinary garden soil.

Principal Species and Varieties :—

clinopodioides, 15″, Je., bl., pur.
— media, lvs. narrow (*syn.* serphyllacea of *Botanical Magazine* 906).
— dasyantha, 6″, Jy., red (*syns.* dasyantha and Puschkini of *Botanical Magazine* 1093).

ZIZYPHUS.

Stove, greenhouse, and hardy trees (*ord.* Rhamneæ), of little horticultural value. The fruits of sativus (*syn.* vulgaris) afford jujubes. Propagation, by cuttings of ripened shoots under a bell-glass. Soil, light sandy loam.

Principal Species :—

incurva, 15′, Je., hdy., grn.
Jujuba, 50′, Ap., grh., grn. Jujube Tree.
Lotus, 6′, fruit yel. African or Jujube Lotus.
mucronata, 25′, Je., grh., grn.
Paliurus (now Paliurus Spina-Christi).
sativa, 10′, Aug., hdy., fruit red, blk. (*syn.* vulgaris).

ZOMICARPA.

Stove, tuberous perennial herbs (*ord.* Aroideæ). Propagation, by division. Soil, fibrous loam and peat, with sand.

Principal Species :—

Pythonium, 1′, spathe vio., lvs. kidney shaped.
riedeliana, 1′, spathe grn.
steigeriana, 1′, spathe blackish pur., spadix wh., dark pur.

ZOMICARPELLA.

Maculata, the only species, is a tuberous-rooted stove perennial (*ord.* Aroideæ), with a dull green spathe and black spadix. (For culture, *see* Zomicarpa.)

ZORNIA.

Stove and greenhouse annual and perennial herbs (*ord.* Leguminosæ), very few of which are in cultivation. Propagation, by seeds. Soil, light loam.

Principal Species :—

bracteata, 6″, Jy., grh. per., yel. (*syns.* tetraphylla and Anonymos bracteata).

ZOSTERA. (Grasswrack.)

Hardy sub-aquatics of tufted habit (*ord.* Naiadaceæ), of no horticultural merit. Marina and nana are British species.

Zuccagnia (*see Dipcadi*).
Zygosepalum (*see Zygopetalum*).

ZYGADENUS (*syn.* ZIGADENUS).

Hardy bulbous plants (*ord.* Liliaceæ). Propagation, by division and seeds. Soil, moist peat in a half-shady position.

Principal Species :—

angustifolius, 1½', Je., wh., turning pur. (*syns.* Amianthium angustifolium, Helonias angustifolia, and H. læta minor).
elegans, 2½', Jy., grn., wh., lvs. Grass-like (*syn.* glaucus).
Fremontii, 1½', Je., cream.
glaberrimus, 1½', Jy., wh.
Muscitoxicum, 2', sum., grn., wh. (*syns.* Amianthium Muscætoxicum and Helonias læta).
Nuttallii, 1½', Je., wh.

ZYGO-BATEMANNIA.

Mastersi is a bigeneric hybrid Orchid (*ord.* Orchidaceæ) produced from Batemannia Colleyi × Zygopetalum crinitum, and is intermediate between the two parents; sepals and petals green, marked brown, lip white, purple. (For culture, *see* ZYGOPETALUM.)

ZYGO-COLAX.

A group of hybrid Orchids (*ord.* Orchidaceæ) obtained by crossing Zygopetalum with Colax. (For culture, *see* ZYGOPETALUM.)

Principal Hybrids :—

[NOTE.—s. = sepals, p. = petals, l. = lip.]

amesianus (Z. brachypetalum × C. jugosus); s. and p. grn., marked pur., l. wh., vio.
leopardinus (Z. maxillare × C. jugosus); s. and p. greenish wh., marked pur., l. bl., wh.
— Wigan's var. (Z. Gautieri — *syn.* maxillare var. × C. jugosus); a fine hybrid with richer colouring and more decided markings.
Veitchii (Z. crinitum × C. jugosus); s. and p. yel., grn., marked pur. br., l. wh., vio.
— Kromeri, s. and p. grn., with dark br. spots, l. wh., lined vio. bl.
wiganianus (Z. intermedium × C. jugosus); s. and p. dull grn., marked greenish pur., l. wh., vio.

ZYGOPETALUM.

Description.—A large genus (*ord.* Orchidaceæ) of epiphytal stove and greenhouse Orchids, all from the warmer parts of America. Bollea, Galeottia, Huntleya, Kefersteinia, Pescatorea, Promenæa, and Warscewiczella are all now included with the Zygopetalums. The flowers, which are, in not a few cases, large and showy, are usually produced during late autumn and winter, and upon some of the species they last a long time in good condition.

Propagation.—By division and imported pieces.

Soil.—Fibrous peat from which all the finer particles have been shaken, and chopped sphagnum. Mackaii thrives with a little fibrous loam added.

Other Cultural Points.—All the Zygopetalums are shade loving subjects, but they vary a good deal as to the treatment required. What may be called the true Zygopetalums, as typified by Mackaii, may be grown in pots along with the warmth-loving Cattleyas. The Promenæa section does best in pans, nearly filled with crocks, and hung up close to the glass in a cool house during summer, and in a warmer (intermediate) one in the autumn, winter, and early spring. All the species with creeping rhizomes thrive if fastened to blocks of wood—Birch preferably, with the bark on. Gramineum, and other species like it, do well in small Teak baskets. The atmospheric moisture must be equable, and as much diffused light as possible should be given. Disturb the roots only when the compost is inclined to become sour, thus rendering a shift inevitable. (For hybrids raised between Zygopetalum and Batemannia, *see* ZYGO-BATEMANNIA; between Zygopetalum and Colax, *see* ZYGO-COLAX.)

Principal Species and Varieties :—

[NOTE.—s. = sepals, p. = petals, l. = lip. In many cases the extreme height refers to plant in flower.]

Balli, 6" to 10", win., st., s. rosy car., p. ro., wh., l. wh., rosy pur., crest bl.
brachypetalum, 1' to 2', win., intermediate, 2½" across, s. and p. br., l. mauve, crest furrowed, wh.
— stenopetalum, segments narrower.
Burkei, 9" to 18", win., st., s. and p. grn., lined br., l. wh., crest fleshy, vio.
Burtii, 8" to 15", sum., st., s. and p. wh., yel., reddish br., l. half wh., half reddish br. Pitt's var. is very fine.
candidum, 6" to 9", sum., st., s. and p. wh., l. wh., vio. (*syns.* Huntleya, Warrea, and Warscewiczella candida).
cœleste, 6" to 10", sum., intermediate, s. and p. bluish vio., l. with a yel. crest (*syn.* Bollea cœlestis).
crinitum, 1' to 2½', win., spr., intermediate, s. and p. grn., barred br., l. wh., veined vio. bl. or reddish crim. Cœruleum is a pretty var.
dayanum, 8" to 15", win., st., s. and p. wh., tipped pale grn., l. wh., crest crim. (*syn.* Pescatorea dayana). Candidulum, rhodacrum, and splendens are good vars.
gairianum, 8" to 15", st., s and p. deep vio., l. pur. ro. or pur. mauve; pretty (*syn.* Pescatorea gairiana.
Gautieri, 9" to 20", intermediate, s. and p. grn., barred br., l. yel., spotted reddish pur. (*syn.* maxillare Gautieri).
intermedium (Lodd.), 1' to 2½', aut., intermediate, s. and p. grn., usually blotched br., l. wh., lined vio. pur., bi-lobed (*syn.* velutinum).
Klabochorum, 12" to 15", st., s. and p. wh., pur., l. wh. or yel. with crim. papillæ pur. tipped (*syn.* Pescatorea Klabochorum).
— excellens, larger.
Lindeniæ, 4" to 8", sum., various, st., s. and p. rosy pk., l. wh., lined rosy pk.
Mackaii, 1' to 2½', aut., win., st. or intermediate, s. and p. yel., grn., blotched yel., br., l. wh., striped and spotted vio., pur. (*syn.* Eulophia mackaiana).
maxillare, 8" to 18', various, intermediate, s. and p. grn., barred chocolate br., l. three-lobed, vio. bl.
rostratum, 6" to 10", various, st., s. and p. greenish, shade rosy br., l. wh., streaked pur., crest yel., pur. (*syn.* Zygosepalum rostratum).
venustum, 6" to 14", sum., st., s. and p. wh., l. wh. pur.
Wallisii, 6" to 12", various, st., s. and p. creamy wh., tipped bluish vio., l. vio., margined wh. (*syn.* Pescatorea Wallisii).
xanthinum, 3", late sum., intermediate, s. and p. citron yel., l. yel., spotted red (*syns.* Maxillaria and Promenæa xanthina and P. citrina.)

Principal Hybrids :—

Clayi (crinitum × maxillare), 1' to 2½', st., s. and p. grn., l. vio. pur.
leucochilum (Mackaii × Burkei), 8" to 15", s. and p. light grn., l. wh., striped vio.
pentachromum (Mackaii × maxillare), 1' to 2½', s. and p. grn., blotched br., l. wh., striped vio.
Perrenoudii (intermedium × Gautieri), 1' to 2', s. and p. pur., br., grn., l. pur., crest wh.
Sedenii (maxillare × Mackaii), 1' to 2', s. and p. br., pur., margined grn.; l. vio. bl.
Veitchii (*see* Zygo-Colax Veitchii).

Other Species :—

aromaticum, 6″ to 12″, st., s. and p. wh., l. azure bl. (*syns.* Huntleya and Warscewiczella aromatica).
cerinum, 6″ to 12″, aut., st., s., p., and l. pale yel., crest furrowed, br. (*syns.* Huntleya and Pescatorea cerina).
cochleare, 6″ to 15″, sum., st., wh., l. lined vio., fragrant (*syn.* Warscewiczella cochlearis).
discolor, 6″ to 12″, sum., st., s. and p. wh. or yel., with a flushing of pur., l. vio. pur. (*syns.* Warrea and Warscewiczella discolor).
gramineum, 5″ to 10″, various, st., s., p., and l. yel., grn., spotted reddish br. (*syn.* Kefersteinia graminea).
grandiflorum, 8″ to 12″, late sum., st., s. and p. grn., banded br., l. wh., lined pur.
jorisianum, 6″ to 15″, sum., intermediate, s. and p. grn., heavily barred pur. br., l. wh., pur., three lobed.
Lalindei, 7″ to 14″, various, st., s. and p. ro., yel., vio., gr., l. yel.
Lehmannii, 10″ to 18″, various, st., s. and p. wh., striped pur., l. mauve pur. (*syn.* Pescatorea Lehmannii).
Lindeni, 6″ to 9″, various, st., s. and p. wh., l. wh., pur.
marginatum, various, st., s. and p. yel., wh., l. wh., pur. ro. (*syns.* Warrea quadrata and Warscewiczella marginata).
maxillare Gautieri (*see* Gautieri).
Meleagris, 6″ to 12″, sum., st., wh., yel., reddish br., crest wh., fringed (*syns.* Batemannia and Huntleya Meleagris). Albidofulvum is a var.
Rollisonii, 3″, aut., win., intermediate, s. and p. pale yel., l. wh., spotted crim.
schroderianum, 8″ to 16″, spr., s. and p. wh., l. ro., pur.
stapelioides, 3″, sum., intermediate, s. and p. grn., yel., spotted and striped pur., l. similarly coloured, three lobed (*syns.* Promenæa and Maxillaria stapelioides).
wailesianum, 6″ to 9″, aut., st., s. and p. wh., l. wh., flushed bl. (*syns.* Warrea and Warscewiczella wailesiana).
Wendlandii, 6″ to 10″, aut., st., s. and p. pale yel., grn., or wh., l. wh., bluish vio. (*syn.* Warscewiczella Wendlandii).

ZYGOPHYLLUM. (Bean Caper.)

Greenhouse and half-hardy and hardy shrubs, sub-shrubs, and perennial herbs (*ord.* Zygophylleæ), of little value horticulturally. Propagation, by seeds and young cuttings. Soil, light sandy loam. Fabago is the Syrian Bean. Caper, 3′, summer, yellow, a hardy perennial, is sometimes grown.

ZYGOSTATES (*syn.* Dactylostyles).

Stove epiphytic Orchids (*ord.* Orchidaceæ), only one of which is in cultivation.

Principal Species :—

greeniana, petals wh., lip wh., grn., pseudo-bulbs Pear shaped.

GLOSSARY.

[Note.—To economise space masculine terminations only are given, except in the case of Acanthifolius, Acanthifolia, Acanthifolium, which is quoted as an example of the different terminations.]

A

A, indicating absence.
Abraded, rubbed off.
Abcissus, cut off.
Abruptly pinnate, a pinnate leaf without an odd leaflet at the apex.
Acanthifolius, Acanthifolia, Acanthifolium, prickly leaved.
Acaulis, apparently without a stem.
Accedent, approaching.
Accrescent, to increase in size after flowering; an accrescent calyx is one that becomes larger as the fruit develops, as in Physalis.
Accrete, fastened or growing to an adjoining organ.
Accumbent, seed leaves which have their edges applied to the folded radicle are said to be accumbent.
Aceous, used in the terminations of names to denote a resemblance, as foliaceous, like a leaf.
Acephalous, without a head.
Acerose, linear needle shaped, as in the leaves of the Firs.
Acervate, in dense clusters.
Acetarious, pertaining to salad plants.
Achene, a dry, superior single carpel containing one seed, and not opening when ripe.
Acicular, needle shaped.
Acinaciformis, scimitar shaped, curved, rounded to the point, thick on the straighter edge and thin on the other.
Acotyledons, plants which have no seed leaves or cotyledons: Ferns and cryptogamic plants generally. The term is rarely used now.
Acris, sharp, bitter.
Aculeate, prickly.
Aculeolatus, armed with small prickles.
Aculeus, a prickle: a sharp, hard process of the epidermis. Prickles fall off when old, spines do not.
Acuminate, tapering sharply to a point.
Acutangulus, sharp-angled.
Acute, sharp.
Adherent, united; union of dissimilar parts usually distinct, as ovary to calyx.
Adnate, united lengthwise.
Adpressed, closely pressed to some surface.
Adunous, bent like a hook.
Adventitious, accidental; not normal, as the aërial roots on Vine rods.
Æmulus, rivalling.
Æqualis, equal and uniform.
Aërophyte, a plant which lives exclusively in the air, attached to some object.
Æstivalis, relating to summer.
Affinis, related.
Agglomerate, gathered into a head.
Agglutinated, glued together, as the pollinia or pollen masses of Orchids.
Aggregate, crowded together, as the flowers of the Thrift (Armeria).
Agrestis, rustic, relating to a field.
Agynous, without female organs, *i.e.* a staminate flower.
Ala, a wing; *alæ*, the lateral petals of a Pea shaped flower.
Alatus, winged, with a membranous expansion.
Albescent, becoming white, changing or fading to white.
Albinism, whiteness, brought about by the absence of chlorophyll or colouring matters.
Albispinus, white spined.
Albumen, nutritive matter of the seed embryo.
Alburnum, the soft layer, or sapwood, found between the inner bark and the hard wood of a tree.
Albus, white.
Alcicornis, shaped like an elk's horn, as the fronds of Platycerium alcicorne.
Algæ, water plants of simple construction.

Alliaceous, belonging to the Onion family, or possessing the odour of Garlic.
Allophyllous, with dissimilar leaves.
Aloides, like the Aloe.
Alpestris, of the mountains.
Alpinus, alpine.
Alsinaceous, having intervals between the petals, as in the Chickweed.
Alternate, arranged on different levels, as the leaves of the Borage.
Altissimus, the highest.
Alveolate, like a honeycomb, with regular cavities on the surface.
Amabilis, lovable.
Amarus, bitter.
Amentum, a deciduous spike of unisexual flowers, as the male inflorescence of the Hazel.
Amethystoglossus, with an amethyst-like tongue.
Amœnus, pleasing.
Amorphous, shapeless, without definite form.
Amphibious, living on land and in water.
Amphicarpous, having two kinds of fruit or times of ripening.
Amphitropous, curved upon itself (applied to the embryo).
Amplexicaulis, embracing or sheathing the stem, as the leaves of Lychnis Flos-Jovis.
Amplus, of ample proportions.
Ampulla, a hollow, bladder-like appendage of some aquatic plants; *e.g.* Utricularia.
Amygdaloid, resembling Almonds.
Amylaceous, having the properties of starch.
Anacanthous, without spines.
Analogous, resembling in certain respects.
Anandrous, without stamens.
Anantherous, destitute of anthers.
Ananthous, without flowers.
Anastomosis, the union of vessels or nerves of a leaf.
Anatomy, the study of structures.
Anatropous, with an inverted ovule.
Anceps, with two edges, as the stem of an Iris.
Andrœcium, the male organ or collection of male organs in a flower.
Androgynous, possessing male and female flowers, as in the Melon.
Andropetalous, with the stamens changed into petals, as in some double flowers; *e.g.* Roses.
Anemophilous, wind loving; fertilised by the wind, as the Conifers and Willows.
Aner, used in composition to denote male.
Anfractuose, wavy, bending, sinuous.
Angienchyma, the name given to vascular tissue.
Angiosperm, a plant whose seeds are enclosed in a capsule, as is usual with all flowering plants and trees, except Conifers and their allies.
Angular, with angles; opposed to cylindrical. The Archangel has angular stems and the Iris an angular seed vessel.
Angustifolius, narrow leaved.
Anisomerous, unequally divided.
Annotinus, of one year's growth.
Annual, existing for one year only.
Annular, ringed.
Annularis, possessing rings.
Anterior, placed in front.
Anther, the lobes of the stamen which contain the pollen.
Antheridium, the male organ in cryptogamic plants.
Antherozoid, a male fertilising cell; the fertilising body from an antheridium.
Anthesis, referring to the opening of flowers.
Anthodium, the inflorescence of a compound flower.
Anthos, a flower.
Anthotaxis, the arrangement of flowers on axes.
Anticus, placed in front of a flower.
Apertus, exposed, not covered.
Apetalous, without petals.
Apex, the point or termination of a leaf, etc.
Aphyllus, leafless.
Apical, at the point, or apex.
Apiculate, pointed; having a little point.
Apocarpus, with carpels free from each other.
Apoda, not possessing a foot.
Apogynous, dying after once producing fruit.
Apothecium, a shield-like fructification, as in Lichens.
Appendiculatus, with an appendage.
Applanatus, flattened.
Apposite, placed side by side.
Approximate, close, near together.
Apterous, wingless.
Aquaticus, living in water.
Aquatilis, living under water.
Arachnoideus, covered with fine hairs, like a cobweb.
Arbor, a tree.
Arborescent, tree-like.
Arbuscular, shrub-like.
Archegonium, the young female organ in cryptogamous plants.
Arcuate, curved like a bow.
Ardens, fiery.
Arenosus, sandy.
Areolate, divided into distinct open spaces.
Argenteus, silvery.
Argutus, sharply pointed.
Aridus, arid, dry
Aril or *Arillus*, an extra seed covering.
Aristate, furnished with awns.
Armatus, armed, possessing prickles, etc.
Armillaris, possessing a collar.
Aromaticus, pungent smelling.
Articulatus, jointed, easily separating.
Arundinaceous, Reed-like.
Arvensis, relating to a field.
Ascending, a procumbent stem which rises from its base, as that of Veronica spicata.
Ascidiform, bottle shaped, pitcher shaped.
Ascidium, a folded leaf; a pitcher, as in Nepenthes.
Ascigerous, bearing asci.
Ascus, a bag containing spores, found in cryptogamic plants.
Asperifolia, rough leaved.
Asperous, rough.
Aspersus, diffused, scattered.
Assimilation, feeding.
Assimilis, similar.
Assurgent, curved upwards.
Ater or *atro-*, black, sad coloured.
Attenuated, becoming slender towards the extremities.
Augustus, majestic.
Aurantiacus, of an orange colour.
Auratus, golden.
Aureus, yellow or golden.
Auricomus, with golden hairs.
Auriculate, ear-like, or having an ear shaped appendage.
Australis, southern.
Autumnalis, pertaining to the autumn.
Avil, an awn.
Awl shaped, narrow pointed.
Awn, the sharp point or beard found in Barley and some Grasses.
Axil, the angle between the leaf and stem of a plant.
Axillary, arising from an axil.
Azaleos, dry.
Azureus, of an azure blue.

B

Bacca, a berry; a fruit having its seeds immersed in pulp; *e.g.* Gooseberry.
Baccate, berried, fleshy.
Bacciferous, bearing berries.
Barb, hooked hairs on plant surfaces.
Barbate, bearded, bearing tufts of hooked hairs, as in Chelone barbata.
Bark, the outer covering of stems and roots.
Barred, crossed in a bar-like manner with another colour.
Barren, unfruitful, applied to flowers possessing only male organs and fronds of Ferns which bear no spores.
Basal, attached to the base.
Basifixed, attached by the base.

Basinerved, applied to leaves whose nerves or veins spring from their bases.

Bass or *Bast*, the inner bark of dicotyledonous trees; that of the Lime tree is generally used in the manufacture of what are known as Bass mats.

Beak, a pointed projection resembling the beak of a bird, as the fruit of Geranium and Pelargonium.

Bedeguar, a hairy excrescence found chiefly in Roses, caused by a gall fly (Cynips).

Bellus, pretty, beautiful.

Berberifolius, with leaves like those of a Berberis.

Bi-articulate, two jointed.

Bi-auriculate, with two auricles or ears.

Bi-bracteate, with two bracts.

Bicolor, two coloured.

Bi-conjugate, side by side, in pairs.

Bicornis, with two horns.

Bicuspidate, twice pointed.

Bidentate, two toothed.

Biennial, a plant which requires two years to develop seed, after which it dies.

Bifarious, in two ranks or rows.

Biferous, fruiting twice in a year.

Bifid, divided halfway into two parts.

Bifoliate, two leaved, generally applied to compound leaves which have their leaflets in a double row.

Bifurcate, forked doubly, twice divided.

Bigeminate, in double pairs.

Bigener, a popular abbreviation of the term bigeneric hybrid, a plant produced from a cross between two species belonging to different genera; *e.g.* Lælio-Cattleya.

Bijugate, applied to compound leaves which have two pairs of leaflets.

Bilabiate, two lipped, as the flowers of Erythrina Crista-galli and Lamium.

Bilobate, with two lobes, as the leaves of the Maidenhair tree (Ginkgo biloba).

Bilocular, with two cells.

Bimarginate, with a double margin.

Binate, in pairs, applied to a leaf composed of two leaflets.

Bipartite, divided in two parts nearly to the base.

Bipinnate, twice divided to the base.

Bipinnatifid, with all the segments of the leaf divided halfway to the base.

Biplicate, doubly folded or plaited.

Biramus, double branched.

Bis, twice.

Bisaccate, with two pouches.

Bisectus, cut into two parts.

Biseriate, arranged in two parallel rows.

Biserrate, applied to a toothed leaf the teeth of which are again cut or notched, the teeth directed forward.

Bisetous, with two bristles.

Bisexual, containing male and female organs in the same flower, hermaphrodite.

Bisulcate, with two furrows.

Biternate, twice divided into threes.

Blade, the broad part of a leaf.

Blanching, making white.

Blandus, pleasing, beautiful.

Bletting, the change by which a fruit becomes mellow after being picked, really a condition of incipient decay; *e.g.* the Medlar.

Blight, a popular name for any attack of insects and fungi.

Blossom, the flower of a plant, popularly applied to the corolla.

Bole, the trunk of a tree, from the ground line to the first tier of branches.

Bonus, good.

Border, the spreading part of a gamopetalous blossom; *e.g.* the Primrose and Auricula.

Borealis, pertaining to the north.

Botany, the science which deals with the anatomy, physiology, and morphology of plants; now divided into many sections.

Botryoides, having bunches; like Grapes.

Brachiate, having arms or branches.

Brachy, short; *e.g.* brachyfolius, short leaved, etc.

Brachyandrous, with short stamens.

Bracteate, furnished with bracts.

Bracteoles, small bracts.

Bracts, irregularly developed leaves which are intermixed with the inflorescence.

Brevis, short; brevifolius, short leaved, etc.

Brilliantissimus, most brilliant.

Bristles, stiff, short hairs.

Bryoides, moss-like.

Bud, an axis on a stem or branch which contains the rudiments of stems, leaves, or flowers.

Bufonius, relating to the toad.

Bulb, buds consisting of fleshy scales.

Bulbiferous, bearing bulbs.

Bulbils, small bulbs or modified buds which are produced in the axils of the leaves in Lilies and other plants.

Bullatus, covered with small bubbles or pustules.

Butyraceous, yielding butter.

Buxifolius, Box leaved.

Byzantinus, Turkish.

C

Caducous, falling off early, as the calyx of the Poppy.

Cæruleus, blue.

Cæsious, of a pale blue or bluish grey colour.

Cæspitose, growing in tufts.

Calathiform, concave, like a cup, or hemispherical.

Calcarate, spurred, or spur shaped.

Calcareous, chalky.

Calceolate, slipper-like; *e.g.* the pouch of the flowers of Calceolaria and Cypripedium.

Callosity, a leathery or hardened thickening.

Callus, the healing tissue formed at the end of a wound or on the base of a cutting prior to the formation of roots.

Calothrix, beautiful-haired.

Calycifloræ, a subdivision of Dicotyledons with stamens inserted on the calyx of the polypetalous flowers.

Calyciform, shaped like a calyx.

Calycinous, possessing a calyx.

Calycle, a row of leaflets beneath the calyx.

Calyculate, having bracts which resemble an additional calyx.

Calyptrate, hooded, with an extinguisher-like covering, as that which covers the theca in mosses.

Calyx, the outer whorl of leaves in a flower, often green in colour, and subject to many modifications.

Cambium, a layer of cells found between the inner bark and the wood. This, by division, gives rise to new bark to the exterior and new wood to the interior. It was formerly described as a viscid or mucilaginous fluid, but this is erroneous.

Campanulate, bell shaped, as the flowers of the Campanula.

Campestris, belonging to the plains.

Canaliculate, furrowed or channelled.

Cancellate, resembling lattice-work.

Candicans, white, or becoming white.

Candidissimus, whitest, very white and shining.

Candidus, shining white.

Canescens, greyish white, surface hairy.

Cancscent, hoary, almost white.

Canina, relating to the dog; *e.g.* the Dog Rose is Rosa canina.

Canus, greyish white.

Capensis, of the Cape, generally referring to the Cape of Good Hope.

Capillary, slender, resembling a hair.

Capitate, growing in a close, dense head.
Capituli, small heads.
Capitulum, a head of flowers without pedicels, as in the Dandelion and Composite flowers generally.
Capreolate, having tendrils.
Capsule, a dry, hollow seed vessel opening in a regular manner by valves, teeth, etc.
Carbonised, burned to a coal.
Cardinalis, red.
Cardiaceous, like a Thistle.
Carina, a keel, such as is formed by the lower petals of a Pea shaped flower.
Carinal, the form of æstivation in which the keel encloses the other parts of the flowers.
Carinate, keeled.
Carious, decayed.
Carminative, promoting perspiration.
Carnation, flesh coloured.
Carnosa or *carneus*, fleshy.
Carpel, the divisions of the seed vessel.
Carpology, the science which deals with fruits.
Carpophore, the stalk which, when present, bears the pistil.
Cartilaginous, of a gristly nature, as the core of an Apple.
Carus, beloved.
Caruncula, a fleshy appendage of seeds.
Cassideous, helmet shaped, as the lip of Coryanthes macrantha, the Helmet Orchid.
Cathartieus, purging.
Catkin, a deciduous spike of flowers and bracts, as in the Hazel.
Caudate, tailed, having a process like a tail; *e.g.* Cypripedium caudatum.
Caudex, the main axis of a plant, sometimes applied to the stems of trees, but more generally to those of Palms and Ferns.
Caudicle, the cartilaginous little strap which connects the pollen masses in some Orchids with the gland.
Caulescent, possessing a stem.
Caulicle, a little stalk which connects the axis of the embryo and the seed leaves.
Cauline, pertaining to a stem.
Caulis, a stem.
Cœvus, hollow.
Cell, a closed sac or leaf, the name given to the divisions in seed carpels; thus the Primrose has a one-celled carpel, Datura Stramonium a two- or four-celled, the Lily a three-celled, and so on.
Cellular, composed of cells.
Cellulose, the substance of which the young cell walls of plants consist.
Centrifugal, developing from the centre first, as the blossoms of the Zonal Pelargonium ("Geranium" of gardens.)
Centripetal, developing the outer flowers first, as Primula sinensis.
Cephaloid, head shaped.
Ceraceous, wax-like.
Cerasiformis, Cherry shaped.
Cereals, Wheat, Barley, etc.
Ceriferous, bearing wax.
Cernuous, pendulous; drooping, as the flower stalks of the Crown Imperial.
Chaffy, covered with membranous scales, as the young leaves of the Pine, Yew, and Cedar.
Chalaza, the part of the nucleus of the seed which is joined to the cover, by which it is fastened to the integuments or seed coats.
Channelled, hollowed out, grooved.
Cheilos, a lip.
Cheir, a hand.
Chlamys, a covering; applied to the floral envelopes.
Chlorophyll, the green colouring matter of leaves and stems.
Chloros, green.
Chlorosis, loss of green colouring.
Chorisis, the multiplication of organs.
Chroma, colour.
Chromagen, the colouring matter of flowers.
Chrys or *chrysos*, gold, golden; *e.g.* Chrysanthemum, golden flower; Chrysophyllum, golden leaf.
Cicatricula, the scar left by a fallen leaf.
Cicatrisatus, scarred; marked with scars where the leaves have fallen off, as the stems of Euphorbia jacquiniæflora.
Ciliæ, stiff hairs.
Ciliated, fringed with hairs, as the lip of Lælia digbyana or Epidendrum Medusæ.
Ciliato-dentate, finely toothed and fringed.
Cinereus, ashy grey.
Cingens, binding round.
Cinnamomeus, like Cinnamon.
Circinate, curled inwards like a crook, as the young fronds of Ferns.
Circum, around.
Circumcissus, cut round, or in a circular manner.
Cirrhiferous, bearing tendrils.
Cirrhose, having tendrils.
Cirrhus, a tendril.
Citrinus, of a lemon yellow colour.
Clados, a branch.
Clammy, viscid, sticky, as the berries of the Mistletoe or the stems of Mimulus glutinosus.
Clarissimus, most brilliant.
Class, in botany, the name given to a division of a sub-kingdom. Under the natural system the vegetable kingdom is divided into two great sub-kingdoms or groups; the first of these is Angiospermæ, with its two classes — Dicotyledons and Monocotyledons.
Classification, the grouping of plants.
Clathrate, latticed, similar to a grating.
Clausus, closed.
Clavate, shaped like a club, with the thick end uppermost, as the flower stalk of Tagetes erecta, the African Marigold.
Claw, the narrowed base of a petal; *e.g.* the Carnation and Wallflower.
Cleft, deeply cut, but not to the midrib.
Cleistogamous. Some plants, as the Violet, produce two kinds of flowers; one the normal, and the other closed, inconspicuous, and often near the ground. These latter are cleistogamous —literally, "closed marriage"; it is these self-fertilised flowers which produce the seeds.
Clinandrium, the part of the column which bears the anthers in Orchids.
Cline, a bed; the part of a plant in which the floral organs are inserted.
Cloves, the popular name given to the young bulbs or divisions of Garlic and Shallots.
Cluster, a close head of flowers, as in the Lilac.
Clypeate, shield shaped.
Coadnatus or *Coadunatus*, united at the base.
Coarctate, compact, pressed together.
Coccineus, scarlet.
Coccus, a dry cell or capsule.
Cochleariform, shaped like a spoon.
Cochlearis, spiral, snail-like, or spoon shaped.
Cochleate, convoluted like a snail's shell, as the lip of Epidendrum cochleatum.
Cœlestis, sky blue in colour.
Cœlospermæ, seeds which possess albumen at their extremities.
Cæruleus, *Cæruleus*, blue.
Cohering, connected, applied to the union of identical parts, as the petals of a monopetalous corolla.
Cohesion, the union of parts in the same whorl.
Coleorhiza, the sheath of a monocotyledonous embryonic radicle.
Collar, the part of a plant from which the stem and roots spring.
Collateral, side by side.

Collinus, growing on low hills.
Colorans, colouring.
Colosseus, very large, gigantic.
Column, an upright little pillar in the centre of a capsule which bears the seeds; also applied to the part of an Orchid which carries the anther and stigma, and which is formed by the union of the filaments and styles of the fructifying organs.
Coma, a tuft of hair, or the arrangement of the branches of a tree.
Comatus, hairy.
Comb-like, leaves with wings arranged like the teeth of a comb.
Comminuted, pulverised.
Common, belonging to both stem and leaf. The outer covering of a Dandelion flower and other Compositæ is called the common calyx, as it includes the whole of the florets which go to make up the capitulum.
Comose, covered with hairs.
Compact, growing close together.
Complanate, levelled or flattened.
Completus, flowers which possess both calyx and corolla.
Complicate, folded upon itself; doubled together.
Compound, formed of several parts which are united in one common whole. A compound flower is composed of several simple flowers, as the Thistle; a compound leaf, of several simple leaves, as the Robinia; a compound berry, of several simple berries, as the Raspberry.
Compressed, flattened laterally. The cup of the Wallflower is compressed, as is its pod, and that of Cardamine pratensis, the Lady's Smock or Cuckoo Flower.
Concave, hollowed like a bowl.
Concentric, having a common centre.
Conceptacle, a hollow sac containing a cluster of spores.
Conchiformis, shaped like a shell or horn.
Concinnus, elegant.
Concolor, of one colour.
Concrete, hardened.
Conduplicate, folded face to face.
Cone, a hard fruit composed of bracts which shelter naked seeds, as in the Fir and Cedar.
Confertus, crowded.
Confervoid, formed of a single row of cells.
Confluent, becoming united in growth.
Congestus, crowded together.
Conglobatus, collected into a globular form.
Conglomeratus, congregated; several spikes crowded together, as in the Cocksfoot Grass, Dactylis glomeratus.
Conidia, bud-like spores in Fungi.
Conjugate, joined in pairs; generally applied to a stalk which bears but one pair of leaflets.
Connate, applied generally to opposite leaves which are united at their bases.
Connective, the filament which connects the anther lobes.
Connivent, converging; arching over to meet each other, as the petals of the Pæony.
Consolidus, consolidated.
Conspicuus, strikingly apparent.
Constrictus, contracted in some particular place.
Contiguous, rising parallel with the stem and almost pressed to it, as the pods of the common Mustard.
Contorted, twisted; applied to buds whose parts are twisted in direction.
Converging, *see* connivent.
Convex, rising like the surface of a globe.
Convolute, rolled together from one side.
Coralloid, like coral.
Cordate, heart shaped, as the leaves of the Violet.
Cordifolius, with heart shaped leaves.
Cordiform, shaped like a heart.
Coriaceous, tough, of the consistence of leather.
Corm, a fleshy, underground stem, solid and bulb-like, but without apparent scales; *e.g.* the Cyclamen or Crocus.
Cormophytes, plants which possess stems
Corneous, horny
Corniculatus, with processes like small horns.
Cornutus, horned.
Corolla, the petals of a flower
Corona, an outgrowth from the petals, a crown. The cup of the Daffodil is so called, as are the rays of the Passion Flower.
Coronatus, crowned.
Corrosive, wearing or eating away.
Corrugated, wrinkled, crumpled.
Cortex, bark.
Cortical, pertaining to the bark.
Corunule, the downy crown of seeds.
Coruscans, flashing
Corymb, a raceme whose pedicels shorten towards the top, so as to bring the constituent flowers on a level, as in the Wallflower and Candytuft.
Corymbose, in the form of a corymb.
Corymbulose, arranged in many small corymbs.
Costa, a rib; the name given to the prominent veins of a leaf, more especially the central one.
Costate, ribbed, or furnished with a midrib.
Cotyledons, seed leaves; the first leaves of a plant, often temporary.
Crassicaulis, thick stemmed.
Crassifolius, thick leaved.
Crassus, thick.
Crenate, notched with rounded teeth; scolloped.
Crenatures, the marginal divisions of crenate leaves.
Crenulate, minutely crenated or notched.
Crested, an irregular, raised ridge in the form of an appendage, as in the fronds of Pteris serrulata cristata.
Cribrose, perforated like a sieve.
Crinitus, possessing stiff hairs in tufts.
Crispate, with leaves crisped or curled at the margins; *e.g.* Parsley.
Cristatus, crested.
Croceus, of a saffron colour.
Cross fertilisation, impregnating the ovule of one flower with pollen from another but similar flower of the same species.
Cruciate, shaped like a cross.
Cruciform, with petals arranged like a cross.
Cruentus, bloody.
Crustaceous, having a hard, brittle shell
Cryptogamia, a division of the vegetable kingdom, comprising plants which have no seed leaves and produce no flowers; *e.g.* Ferns, mosses, and Lichens
Cryptogamous, with organs of fructification obscure or hidden.
Cucullate, formed like a hood.
Culm, straw, the stalks of Grasses
Cultrate or *cultriform*, of the shape of a knife.
Cuneate, like a wedge with the broadest end uppermost, as the pinnules of the Maidenhair Fern, Adiantum cuneatum.
Cupreus, copper coloured.
Cupulate, like an inverted bell.
Cupule, the cup of an Acorn or Nut, applied to the bracts of Amentaceous plants.
Curtus, short.
Cuspidate, pointed like a spear; terminating in a point.
Cutaneous, relating to the skin.
Cuticle, the outer skin or epidermis; strictly, the tough membrane overlying the epidermis.
Cyaneus, of a clear, bright blue colour.
Cyathiform, cup shaped, widest at the top, as the calyx of Polemonium.

Cylindrical, round, in the form of a cylinder.
Cymbiform, boat shaped.
Cyme, a centrifugal inflorescence.
Cypsela, a hollow, one seeded fruit of a composite flower ; *e.g.* the seed of the Dandelion invested by an adnate calyx.
Cytos, a cell.

D

Daddock, the rotten body of a tree.
Dallop, a tuft or clump.
Dasy-, thickly covered with hairs.
Dasycarpus, hairy fruited.
Dasyphyllus, hairy leaved.
Dealbatus, whitened, covered with a white, opaque substance.
Debilis, weakly.
Deca, ten.
Decagynous, with ten pistils.
Decandrous, with ten stamens.
Decapetalous, with ten petals.
Decaphyllous, having ten leaves or perianth segments.
Deciduous, falling off, applied to plants which lose their leaves annually.
Declinate, curved downwards, as the filaments of Echium vulgare.
Decompound, divided into compound sections, as the leaves of the Parsley and Chamomile.
Decorticated, deprived of bark.
Decumbent, lying horizontally with a tendency to become erect at the tips.
Decurrent, running down, when the edges of the leaf extend down the sides of the stem, as in the Comfrey
Decursive, inclined to run down.
Decussate, crossing each other at right angles ; intersecting in such a manner as to resemble a square.
Definite, ending in a single flower, or having a limited number of parts.
Deflexed, turned downwards.
Defoliation, the discarding of leaves.
Deformis, misshapen.
Degeneration, applied to an organ which, becoming less highly developed, changes in appearance, as when leaves revert to scales, or branches to phyllodes, as in some Acacias.
Dehiscent, gaping, opening regularly and liberating seeds, applied to the manner in which a fruit opens.
Delicatus, tender, delicate.
Deliquescent, melting when exposed to the air.
Deltoid, shaped like a triangle with a narrow base.
Delve, to dig.
Demissus, lowered, abased.
Demulcent, capable of softening other things.
Dendriform, formed like a tree.
Dendrometer, an instrument used for measuring trees.
Dens-canis, dog's tooth.
Densus, thick, dense.
Dentate, with the margins divided into tooth-like incisions.
Dentato-ciliate, having toothed margins tipped with fine hairs.
Dentato-sinuate, with toothed and scalloped margins.
Denticulate, with fine teeth, as the margins of Camellia leaves.
Dentiform, tooth shaped.
Denudate, a hairy surface becoming bare.
Depressed, flattened from the top downwards, as the fruit of the Orange.
Desciscens, withdrawing.
Desmos, brought or bound into close contact with.
Detergent, possessed of cleansing power.
Determinate, applied to a definite inflorescence.
Dextrorse, pointed to the right.
Diacantha, with two spines.
Diadelphous, united in two bundles, as the stamens of the False Acacia.
Diaheliotropism, the tendency to lie at right angles to the light.
Dialycarpous, with fruits made up of separate carpels.
Diandrous, having two stamens.
Diaphanous, nearly transparent.
Dichlamydeous, having both calyx and corolla.
Dichogamous, anthers and pistils not ripening together.
Dichotomous, regularly divided or forked into pairs, as the branches of the Mistletoe.
Diclinous, having stamens in one flower and pistils in another.
Dicotyledons, one of the two classes into which flowering plants are divided. Embryo with two seed leaves, leaves with netted veins, and flowers with the organs in twos or fives or their multiples are the characteristics.
Dictyogens, Monocotyledonous plants which have netted veins.
Didisticha, with leaves in two rows.
Didymous, two; united, or in pairs.
Didynamous, with two long and two short stamens in the same flower, as in the Lamium.
Diffuse, scattered, widely spreading.
Digitate, with the lobes of the leaves arranged fingerwise, as in the Lupin.
Digitiform, shaped like fingers.
Digynous, with two styles.
Dilitatus, spreading, dilated.
Dimerus, composed of two pieces.
Dimidiate, divided into two very unequal parts, as a Begonia leaf.
Dimorphous, two forms, when similar parts of plants assume different shapes, as the stamens and pistils of Primulas.
Diœcious, having stamens (male organs) and pistils (female organs) on different plants, as in the Yew tree.
Dipetalous, with two petals.
Diphyllous, two leaved.
Diplostemonous, having twice as many stamens as petals.
Dipterous, two winged.
Dis, twice.
Disc, the surface of a leaf; the centre of a Composite flower, as the yellow inner part of a Daisy.
Discoid, in the form of a flattened sphere ; applied to Composite flowers when the ray florets are suppressed.
Discolor, parti-coloured, with one surface of one colour and the other of another, as the leaves of Vitis (Cissus) discolor.
Dispar, unequal.
Dispermous, having two seeds.
Dissectus, cut into many divisions.
Dissepiment, the internal division of a seed vessel or ovary.
Dissilient, applied to fruits or capsules which burst elastically ; *e.g.* those of Impatiens.
Distichous, with leaves, flowers, or branches in two opposite rows, as the leaves in Taxodium distichum, Vandas, etc.
Diurnus, daily.
Divaricate, spreading, branching at an obtuse angle.
Divergent, gradually spreading outwards from a common centre.
Diversifolius, with different kinds of leaves, as the Water Crowfoot (Ranunculus aquatilis).
Divisus, divided.
Dodeca, twelve.
Dodecagynous, having twelve pistils.
Dodecandrous, having twelve stamens.
Dolabriformis, shaped like an axe.
Domesticus, belonging to a house.
Dorsal, attached to the back, as the large upright sepal in Cypripedium.
Dorsifixed, joined by the back.
Double, applied to flowers whose stamens or pistils have been transformed into petals.
Down, soft, short hairs.
Drupaceous, producing drupes.
Drupe, a stone fruit with a succulent or fleshy covering; *e.g.* the Cherry and Plum.
Drupels, small drupes which compose a fruit, as in the Raspberry.

Dulcis, sweet.
Dumosus, bushy, as the Bramble.
Duplex, double.
Duramen, the heartwood of a tree; the hardened portion of the wood.
Durus, hard, durable.

E

E, without.
Ebenaceous, ebony-like.
Ebracteate, without bracts.
Eburneus, ivory-like.
Echinate, covered with prickles like a hedgehog.
Ecornutus, without horns.
Edentatus, without teeth.
Edibilis, eatable.
Edulis, eatable.
Effuse, applied to panicles of flowers of loose arrangement.
Elatior, higher.
Elatus, elevated, exalted.
Elegans, elegant.
Ellipsoid, an attenuated sphere.
Elliptic, oval, but terminating sharply at each end.
Emarginate, with a notched apex.
Embossed, projecting in the centre like the boss of a shield.
Embracing, applied to a leaf which encircles a stem with its base.
Embryo, a rudimentary plant.
Embryo sac, an embryo cell in which the embryo is found.
Eminens, distinguished.
Endeca, the Greek for eleven.
Endecandrous, with eleven stamens.
Endocarp, inner layer next the seed.
Endochrome, the colouring matter of cells.
Endodermis, the inner cortical layer.
Endogens, inward growers.
Endon, inwards.
Endophlæum, the inner bark of a plant.
Endopleura, the inner covering of a seed.
Endosmosis, the process by which fluids pass inwards through a membrane from one vessel to another of a greater or less density.
Endosperm, albumen, or nutritive matter in the seed.
Endostome, the inner opening of an ovule's covering.
Endothecium, the inner coat of an anther.
Encilema, the inner covering of a seed.
Enervis, without nerves.
Ennea, the Greek for nine.
Ensate or Ensiform, sword shaped, with a straight blade.
Entire, with an undivided margin.
Entomophilous, insect loving, fertilised by insects.
Envelopes, the name given to the calyx and corolla of a blossom, called floral envelopes.
Epi, upon, outside, or above.
Epicalyx, the outer calyx formed of bracts or scales; *e.g* Mallow.
Epicarp, outer covering of fruit.
Epichilium, terminal portion of the jointed lip or labellum of an Orchid.
Epidermis, outer skin.
Epigynous, appearing to grow from the top of the ovary.
Epiphlæum, the outer bark.
Epiphyllous, growing upon the leaf.
Epiphytes, plants which grow suspended in the air, frequently upon other living plants, from which, however, they extract no food; *e.g.* Orchids.
Episperm, the outer cover of a seed.
Equestris, pertaining to a horse.
Equilateral, with equal sides.
Equitant, leaves which alternately overlap each other at their edges; *e.g.* the Iris.
Erectus, upright, applied to an ovule which rises from the base of an ovary.
Eroded, gnawed away, bitten; used to describe a particular kind of irregular denticulation.
Erubescens, becoming red.
Erumpent, apparently bursting through the skin.
Erythrocarpus, bearing red fruits.
Esculentus, fitted for food.
Etiolation, the act of blanching, or whitening, by withholding light.
Etuberosus, without tubers.
Evanescent, quickly fading.
Evolved, unfolded.
Exalbuminous, not possessing albumen.
Exaltatus, elevated, lofty.
Excavated, hollowed out.
Excelsus, lofty.
Excoriate, to strip off the bark or skin.
Exo, on the outside.
Exosmosis, the passage of fluids outwards through a membrane, the opposite of endosmose.
Exotic, foreign.
Exserted, protruding, stamens projecting beyond the corolla; *e.g.* Lilium auratum.
Extine, the outer covering of a pollen grain.
Extrorse, applied to anthers which discharge their pollen on the side away from the pistil.

F

Falcate, bent like a sickle; *e.g.* the leaf of Rochea falcata.
Fallax, deceitful.
Farinaceous, floury or mealy, full of flour.
Fasciation, applied to stems and organs which are united in a flattened manner—the Asparagus frequently presents this appearance in its young stems.
Fascicle, a flattened inflorescence made up of many flowers so arranged that their corollas are on a level, as in the Sweet William and other Dianthuses.
Fasciculatus, arranged in bundles.
Fastigiate, tapering to a narrow point, of a pyramidal shape owing to the branches growing erect and parallel; *e.g.* the Lombardy Poplar.
Fauces, the jaws, or gaping part of a monopetalous corolla; *e.g.* Salvia patens.
Favose, pitted like a honeycomb.
Feathery, resembling a feather; leaves whose veins pass from the midrib at an acute angle to the margin.
Fecundation, fertilisation.
Felix, happy.
Female flowers, containing pistils but no stamens.
Fenestralis, furnished with openings, windowed.
Feroces, set with spines.
Ferox, fierce.
Ferreus, resembling iron, very hard.
Ferrugineus, of the colour of iron rust, rusty.
Fertile, flowers which bear seeds capable of vegetating: also applied to the spore bearing fronds of Ferns.
Fibres, woody strings or nerves of leaves and stems; *e.g.* Broad-leaved Plantain.
Fibrillose, covered with fibres.
Fibrous, composed of fibres or threads.
Fibro-vascular tissue, composed of vessels which contain spiral and other fibres and vessels.
Ficoideus, like a Fig.
Fid, cleft.
Filament, the thread-like part of a stamen which supports the anther; also any thread-like body.
Filicaulis, having a thread-like stem.
Filices, Ferns, the name given to the first order of cryptogamous plants.
Filiform, thread shaped; *e.g.* the stamens of Maize.
Fimbriate, fringed.
Fissure, a slit in an organ.
Fissus, cloven.
Fistular, hollow, but closed at the extremities; *e.g.* the fruiting stems of Onions.
Flabellate, fan shaped; *e.g.* leaves of Latania borbonica.
Flaccid, weak, flabby, feeble.
Flagelliformis, shaped like a whip; *e.g.* stems of Cereus flagelliformis.
Flammeus, flame coloured.

Flavescens, becoming yellow.
Flavus, pale yellow.
Flexilis, pliable, flexible.
Flexuose, crooked, zigzag, changing in direction after each joint.
Floccose, covered with little wool-like tufts.
Flore pleno, double flowered.
Florets, little flowers; the small, individual flowers (often called petals) which go to make up a Composite flower.
Floridus, flourishing.
Floriferous, bearing flowers.
Flos, a flower.
Fœtidus, stinking.
Foliaceous, leafy, having the form of leaves.
Foliaris, an appendage to a leaf.
Foliation, leaf development.
Foliosus, with leaves exceptionally numerous.
Folium, a leaf.
Fontanus, pertaining to a spring of water.
Foramen, an opening in the cover of an ovule.
Fornicatus, arched, vaulted.
Foveolate, having pits and depressions.
Fragilis, fragile, breaking readily.
Fragrans, emitting a sweet perfume.
Fragrantissimus, very fragrant, the sweetest of all.
Fraxineus, belonging to the Ash.
Frigidus, cold, freezing.
Fringed, bordered with fine hairs or fringe.
Frond, the leaf of a Fern.
Frondose, applied to cryptogamous plants with leafy expansion.
Fructification, the parts which compose the flower and fruits of a plant.
Fruit, the ripened seed vessel with its contents and external covering.
Frutescens, becoming bushy.
Frutex, a shrub.
Fruticosus, shrubby.
Fucatus, painted, counterfeit.
Fuciformis, like Seaweed.
Fugacious, fading quickly, soon falling, as the petals of the Cistus.
Fulgens, shining.
Fulgidous, burnished.
Fulvus, tawny yellow.
Funalis, rope-like.
Funestus, destructive.
Fungosus, spongy, of the substance of Fungi.
Funicle, the little stalk which attaches the seed to the placenta.
Furcatus, forked.
Furfuraceous, scaly, scurfy.
Fusco-viridis, dark green.
Fuscus, brown.
Fusiformis, spindle shaped; *e.g.* the root of the Carrot.

G

Galeate, helmeted; *e.g.* the Galeopsis, the upper lip of which is called a galea or helmet.
Gamopetalous, applied to a flower whose petals are united; *e.g.* the Primrose.
Gamos, a union or marriage.
Gamosepalous, with united sepals; *e.g.* Primrose.
Gelatinous, jelly-like, consisting of jelly.
Gelidus, cold.
Gemmæ, leafy, as distinguished from flower buds; also applied to vegetative, reproductive bodies in Liverworts.
Gemmatus, bearing buds.
Gemmiparous, reproduced from buds.
Gemnate, doubled, in pairs.
General involucre, the bracts at the base of a general umbel of flowers, as in the Carrot.
Geniculatus, jointed like a knee, knotty.
Genus, a division of a natural order, and made up of allied species and varieties.
Germ or *Germen*, the base of the pistil, the old name for an ovary.
Germinal vesicle, a cell in the embryo-sac from which the embryo is formed.
Germination, the growth of a seed after its period of rest.
Gibbosity, a swelling at the base of an organ.
Gibbous, bulging, protuberant, slightly pouched.
Gigas, a giant.
Gills, thin plates beneath the pileus of an Agaric; *e.g.* Mushroom.
Glaberrimus, very smooth.
Glabrous, smooth, devoid of hairs, like the leaves of Bougainvillea glabra.
Glands, secreting vessels, wart-like, often found at the bases of Peach leaves.
Glandular hairs, hairs which bear glands at their tips, as in the Sundew.
Glans, a nut, such as the Hazel.
Glaucescent, having a bluish grey appearance.
Glaucous, having a sea green appearance, as in Echeveria (now Cotyledon) secunda glauca.
Globiferous, bearing globes or balls.
Globose, spherical, globe shaped.
Glomeratus, congregated in a round head.
Glomerulus, a rounded, cymose inflorescence; *e.g.* Campanula glomerata.
Glucose, the sugar of fruit.
Glume, a bract which encloses the reproductive organs of the Grasses.
Gluten, a nitrogenous substance of seeds.
Glutinous, sticky, covered with adhesive slime.
Gracilis, slender.
Gracillimus, very slender.
Grained, clothed with grain-like protuberances, as the segments of the flowers of the Dock.
Gramineous, Grassy.
Grandis, large, noble.
Granulatus, granular, composed of grains.
Granulose, the formative matter of starch granules.
Gratus, pleasant.
Graveolens, strong smelling.
Gregarious, sociable, herding together.
Grumous, knotted at intervals.
Gummiferous, bearing gum.
Guttatus, covered with small spots.
Gymnogen, a plant whose seeds are not in a true ovary; *e.g.* Conifers.
Gymnos, naked.
Gymnosperms, a botanical term applied to flowering plants with naked ovules, Cycads and Conifers being examples. These plants differ from Angiosperms (other flowering plants) by the pollen being conveyed direct to the micropyle, no style or stigma being present. As soon as the pollen is deposited in the micropyle the mouth contracts, imprisoning the pollen. After a time—varying considerably in length with various species—has elapsed, a short pollen tube grows and forces its way into and fertilises the egg cell, the whole process being much simpler than in Angiosperms.
Gynandrophore, a column which supports stamens and pistils.
Gynandrous, with stamens and pistils united in one column, as in Orchids.
Gyne, a female.
Gynœcium, the collective female reproductive organs.
Gynophore, the stalk which, when present, bears the ovary.
Gyrans, revolving.

H

Habit, a general term applied to style of growth.
Habitat, the place in which a plant is found growing naturally.
Hamosus or *Hamatus*, curved like a hook.
Hastate, shaped like the head of a halberd.

Hastato-lanceolate, between halberd shaped and lanceolate.
Hastato-sagittate, between halberd and arrow shaped.
Hastatus, armed as with spears.
Hastilis, spear shaped.
Haulm, usually applied to the dead stems of herbs.
Haustorium, a root-like organ by which parasites absorb nourishment.
Head, a close cluster of flowers, as in the Composites.
Hederaceous, Ivy-like.
Helianthoides, resembling a Sunflower.
Helicoidal, applied to an inflorescence which bears a resemblance to the shell of a snail.
Heliotropism, positive heliotropism is growing towards the light, and negative heliotropism growing away from it.
Helmet, the hooded upper part of a flower; *e.g.* Aconitum Napellus (Monkshood).
Hemispharicus, hemispherical.
Hemispherical, in the shape of half a globe.
Heptagynous, with seven styles.
Heptandrous, possessing seven stamens.
Herbaceous, without wood; used to distinguish plants which possess annual stems from those having stems of a woody and enduring nature.
Hermaphrodite, containing two sexes.
Hesperidium, the fruit of the Orange and its relatives.
Heteracanthous, with different sorts of spines.
Heterocarpous, with different sorts of fruits.
Heterogamous, applied to Composite flowers which have hermaphrodite and unisexual flowers in the same head.
Heterostyled, with long and short styles, as in the Primula.
Hexagonous, with six sides.
Hexandrous, with six stamens.
Hians, gaping, open, in opposition to closed.
Hilum, the scar or mark on a seed which indicates the place by which it was attached to the placenta.
Hirsutus, rough with hairs, shaggy.
Hirtus, rough haired.
Hispid, rough with stiff, bristly hairs; *e.g.* Borage.
Hoary, covered with greyish or white down.
Holosericeous, covered with minute, silky hairs.
Homogamous, applied to Composite plants which possess heads containing only hermaphrodite flowers.
Homogeneous, uniform in nature, structure, or substance.
Homology, similarity in structure.
Homotropous, with embryos which take the same general direction as the seed.
Hooded, curved into the form of a hood.
Horizontalis, horizontal; a leaf or branch which grows from a stem in a direction parallel to the earth's surface.
Horn, the name given to any long tapering process arising in or from a flower.
Horological, applied to flowers which open and close regularly at certain hours.
Horridus, shaggy, spiny, unpleasant.
Hortensis, relating to a garden.
Humifuse, spreading on the ground.
Humilis, humble, lowly.
Husk, the dry coverings of flowers or fruits, particularly Grasses.
Hyalinus, crystalline, transparent.
Hybernalis, sleeping or resting in winter.
Hybrid, mule; a plant produced by fertilising a flower of one species with pollen taken from another of a different species.
Hyemalis, relating to winter.
Hygrometrical, indicating moisture.
Hyper-, over, above.
Hyphæ, the thread-like tissues of Fungi.
Hypo-, beneath, under.
Hypocrateriformis, shaped like a salver; *e.g.* the blossom of the Primrose.
Hypogynous, situated below the ovary or pistil.
Hypophyllus, inserted beneath the leaves.

I

Icosi, twenty.
Igneus, fiery.
Illustris, famous, brilliant.
Imberbis, without a beard.
Imbricatus, overlapping like tiles or the scales of a Fir cone.
Immaculatus, without spots.
Impari-pinnate, pinnate, but possessing an odd terminal leaflet.
Imperfect, flowers which do not possess both anthers and pistils.
Imperialis, imperial, powerful.
Implexus, entwined, interwoven.
Impressus, marked, impressed.
Inæqualis, unequal.
Inarticulate, without joints.
Incanus, grey with fine hairs, hoary.
Incarnatus, flesh coloured, pink.
Incisus, divided, deeply cut; *e.g.* Hawthorn leaves.
Inclinatus, inclined, bent.
Included, with stamens enclosed within the corolla and not protruding beyond it.
Incomparabilis, incomparable, unexcelled.
Incomplete, applied to a plant which is lacking one of the usual four floral whorls.
Incomptus, rough, unrefined.
Incurvatus, bending inwards.
Indefinite, applied to stamens above twenty; *e.g.* the stamens in Cacti.
Indehiscent, not opening or bursting; having no regular line of opening.
Indeterminate, applied to an indefinite inflorescence.
Indigenous, native to a country, aboriginal.
Indivisus, undivided.
Induplicate, with the edges turned slightly inwards when unfolding from the bud.
Indurated, hardened.
Indusium, a spore case, a membrane covering the spores of some Ferns.
Inermis, unarmed, without spines or thorns.
Inferior, beneath; applied to ovaries around and above which the receptacle has grown.
Inferus, beneath, under.
Inflatus, distended, swollen, like a bladder.
Inflexed, bending inwards.
Inflorescence, the arrangement of flowers, or mode of flowering.
Infractus, broken.
Infundibuliformis, funnel shaped.
Inquinans, contaminating.
Insignis, remarkable.
Inspissated, thickened; applied to dried up sap.
Integrifolius, with entire leaves.
Interfoliar, between two opposite leaves.
Internode, the space between the nodes or joints of a stem.
Interpetiolar, between the petioles or leafstalks.
Interrupted, used to indicate the destruction of a symmetrical arrangement.
Intine, inner coat of a pollen grain.
Intrafoliaceous, within the leaves.
Introrse, applied to anthers which open on the side next to the pistil.
Inverted, applied to an embryo when its radicle is directed towards the end of the seed opposite to its eye or hilum.
Involucellum, the partial involucre of Umbelliferous plants.
Involucral, with an involucre.
Involucre, the appendage of an umbel which is found at a distance from the flowers, or a collection of bracts which encloses many florets. The Carrot illustrates the first instance, and the Dandelion the second.

Involute, rolled inwards; edges of leaves rolled inwards from either side.
Ionantha, violet coloured.
Iridescens, shining.
Irregular, applied to flowers with blossoms which are not uniform; *e.g.* the Carrot, Pea, and Salvia.
Irroratus, moistened.
Iso-, equal.
Isomerous, with different organs composed of an equal number of parts.
Isostemonous, with stamens and floral envelopes composed of the same number of parts.

J

Jointed, articulated, with joints; *e.g.* the stem of Wheat.
Joints, the nodes of a stem.
Jubatus, crested, having a crown of hair, etc.
Jucundus, pleasing.
Juga, the ribs on the seeds of Umbelliferous plants.
Jugatus, joined as with a yoke; *e.g.* the pairs of leaflets in compound leaves, as in the Walnut.
Jugosus, mountainous.
Jugum, a pair of leaflets.
Juliform, in the form of a catkin.
Junceus, Rush-like.
Juvenilis, youthful.

K

Keel, a prominent ridge, the lowest petal or petals of Pea shaped blossoms, so called from a supposed resemblance to the keel of a boat; *e.g.* the Sweet Pea.
Kingdom, one of the sections into which plants are divided which possess broad characteristics in common.
Knarry, knotty.
Knee-jointed, bent at the joints like a knee, as in the Foxtail Grass and Polygonum.

L

Labellum, the lip, or front petal of a flower, especially applied to Orchidaceous plants.
Labiatus, having lips.
Labrosus, with a wide lip.
Lacerus, ragged, lacerated.
Lachrymose, tearful, weeping.
Laciniatus, cut into narrow segments.
Lactescent, yielding milk-like juice.
Lacteus, milky.
Lacuna, a space in the midst of a cell group.
Lacunosus, pitted, covered with little holes or depressions.
Lacustris, belonging to a lake.
Lætivirens, of a bright green colour.
Lævigatus, smooth, polished.
Lævis, free from asperities.
Lamellate, divided into plates like the gills of a Mushroom.
Lamina, blade of a leaf, or the broad part of a petal; literally a plate.
Lanatus, woolly.
Lanceolatus, lance shaped; widest in the centre and tapering to each end, as the leaves of the Oleander.
Lanuginous, woolly; covered with long, interlaced hairs; downy.
Lanugo, soft down or wool.
Lateral, at the side; applied by gardeners to the side shoots of Vines, etc.
Latex, milky fluid.
Laticiferous, containing a milky fluid.
Latticed, open, like lattice work; the leaves of Aponogeton fenestrale, which is popularly known as the Lattice-leaf Plant, are a good illustration of the meaning of this term.
Latus, broad.
Laxus, loosely arranged, opposite to compact.
Leaf, generally applied to the green expansions of plants; the leaves of flowers are called sepals and petals.
Leaflet, a little leaf, applied to the divisions of compound leaves; *e.g.* Rose and Acacia.
Legume, a pod; *e.g.* the edible Pea.
Leguminous, plants which bear pods, as the Pea and Bean.
Lenticel, openings in the young bark which correspond to the stomata of leaves.
Lenticularis, shaped like a Lentil, convex on both sides.
Lentus, tough.
Lepidotus, scaly.
Lepidus, pleasant.
Leprous, covered with spots or scales.
Lianas, twining, woody plants.
Liber, inner, fibrous bark.
Ligneous, woody.
Lignine, a substance of which the secondary linings of cell walls are composed.
Ligulatus, strap shaped.
Liguliflorœ, Composite flowers with strap shaped florets.
Lilacinus, lilac coloured.
Limb, the upper, spreading part of a blossom, as in the Wallflower, the lower part being termed the claw.
Limbatus, bordered, having a dilated surface.
Limbus, limb.
Linearis, with two parellel sides, narrow and long.
Linear-lanceolate, between linear and lanceolate.
Lineatus, streaked with lines.
Linguiformis, tongue shaped.
Lip, one of the two chief divisions of a gaping blossom; *e.g.* the Dead Nettle.
Littoralis, pertaining to the sea shore.
Lividus, livid, bluish grey.
Lobe, a large division of an organ, generally applied to the leaves, petals, and anthers of a plant.
Locular, a uni-locular fruit contains one cell, a bi-locular two, etc.
Loculicidal, fruit opening at the back of the carpels.
Locusta, a spikelet of Grasses.
Lodicule, a scale at the base of the ovary in Grasses.
Loliaceous, pertaining to Tares, weedy.
Lomentum, pod or legume with transverse partitions, each division containing but one seed.
Longus, long.
Lorate, shaped like a thong or strap.
Lucidum, shining.
Lunaris, relating to the moon.
Lunulate, of the shape of a half-moon.
Luridus, pale yellowish grey.
Lutescens, becoming yellow.
Luteus, yellow.
Luxatus, dislocated.
Lyratus, shaped like a lyre; *e.g.* the leaves of the Shepherd's Purse, or Dandelion.

M

Macranthus, long flowered.
Macrocarpus, bearing a large carpel or fruit.
Macrocephalus, large headed.
Macros, large.
Macrospermus, large seeded.
Maculatus, blotched.
Magnificus, magnificent.
Majalis, pertaining to the month of May.
Majesticus, dignified, majestic.
Majus, greater.
Male flowers, such as contain one or more stamens, but no pistils.
Maliformis, shaped like an Apple.
Mammæform, in the shape of a nipple.
Mammosus, with large breasts.
Manicatus, having long scales.
Marcescent, permanent, withering, but not falling off.
Marginatus, having a margin or border.
Marinus or *maritimus*, pertaining to the sea.
Marmoratus, marble-like.
Masculus, male.
Matrix, place of birth or formation.
Matronalis, matronly.
Mattulla, fibrous covering of Palm stems.
Maxillaris, relating to a jaw.

Maximus, the largest.
Medius, middle.
Medulla, pith.
Medullaris, relating to pith or marrow.
Medullary rays, strands of cellular tissue connecting the pith and the bark.
Medullary sheath, cells surrounding the pith.
Megas, large.
Melanos, black.
Melleus, pertaining to honey, tasting like honey.
Melliasmum, sweet smelling.
Melliferous, honey bearing, with nectaries.
Membranous or *membranaceous*, thin, like parchment.
Mericarp, the name given to each of the two halves of the fruit of Umbelliferous plants.
Meshes, openings in tissues.
Mesocarp, the middle layer of a fruit
Mesophlæum, the middle layer of bark.
Mesophyll, the cellular tissue between the upper and lower epidermis of leaves.
Mesos, middle.
Micans, glittering, shining.
Micropyle, the opening in an ovule through which the pollen tube enters.
Micros, small.
Midrib, the middle vein of a leaf, running from the base to the apex.
Militaris, soldier-like.
Minax, overhanging.
Miniatus, vermilion coloured.
Minimus, smallest.
Minus, small.
Minutissimus, very small.
Mirabilis, wonderful, extraordinary.
Mitis, mild.
Mitriform, shaped like a mitre, as the cover of some Mosses.
Mobilis, having the power of motion.
Modestus, modest, unassuming.
Mollis, soft.
Mon, one.
Monadelphous, having the filaments of the stamens united into one bundle.
Moniliform, beaded, with cells united in the manner of a string of beads.
Monocarpellary, with one carpel.
Monocarpic, perishing after fruiting once.
Monochlamydeous, having only one floral covering, which may be either calyx or corolla.
Monoclinous, bisexual, both sexes in one flower, hermaphrodite.
Monocotyledonous, having only one seed leaf.
Monœcious, with the sexes in different flowers on the same plant.
Monogynous, with one pistil in a flower.
Monopetalous, the petals united in one piece; *e.g.* Convolvulus.
Monophyllous, one leaved.
Monospermous, one seeded.
Monticola, a native of the mountains.
Morphology, the study of the forms of organs.
Moschatus, Musky.
Mottled, marked with blotches of colour.
Mucronatus, sharply tipped, dagger pointed.
Multiangularis, many cornered.
Multiceps, many headed.
Multicostate, many ribbed.
Multifarious, arranged in many rows.
Multifid, divided halfway into many parts.
Multiflorus, many flowered.
Multijugus, bearing many pairs of leaflets.
Multi-partite, much divided.
Multus, many.
Munitus, fortified.
Muralis, pertaining to a wall.
Muricate, covered with conical sharp points.
Muriform, with cells arranged like bricks in a wall.
Muscoides, Moss-like.
Muscology, the study of mosses.
Mutabilis, changeable.
Muticus, shortened, pointless.
Mycelium, the spawn of Fungi.
Myri-, innumerable, infinite.

N

Naked-, without leaves, as the stem of the Tulip; also applied to seeds which are not confined in an ovary or to flowers without a calyx.
Nanus, dwarf.
Napiformis, in the form of a Turnip; spherical, but depressed.
Narcotic, producing sleep.
Nasutus, with a large nose.
Natans, floating.
Naturalised, reproducing themselves from seed in other positions than their original home.
Navicularis, shaped like a boat.
Nebulosus, cloudy.
Neck, the upper, tapering part of bulbs or plants; *e.g.* the Onion.
Nectariferous, bearing nectar.
Nectary, a hollow sac, generally at the base of a petal, which secretes nectar.
Neglectus, neglected, unnoticed.
Nemoralis, sylvan, growing in woods or groves.
Nervation, the veining of leaves.
Nerves, the veins or ribs of leaves.
Nervosus, full of nerves.
Netted, covered with lines like a network.
Nidulent, nestling, lying among.
Nidus, nest.
Niger, black.
Nigricans, becoming black.
Nigritus, having a portion blackened.
Nitidum or *Nitidus*, glossy and smooth, shining, brilliant.
Nivalis, appearing during the snow season.
Niveus, white and snowlike, pure white.
Nivosus, snowy.
Nodding, drooping, bent, as the flower stalk of the Daffodil.
Node, a joint, the part of a stem or branch whence leaves spring
Nodiflorus, flowering at the joints.
Nodose, with swollen nodes.
Nodulose, applied to roots and stems which have thickened parts or portions at intervals.
Nubigenous, issuing from clouds.
Nucellus, a cellular mass found in ovules, a portion of the protoplasmic contents of the nucleus.
Nuciferous, bearing nuts.
Nucleus, a kernel, the dense protoplasm in a cell.
Nudicaulis, naked stemmed.
Nudus, naked.
Nummulariæfolia, bearing leaves which are shaped like money, as the Creeping Jenny.
Nut, a hard, dry, one seeded carpel resulting from a compound ovary.
Nutans, nodding.
Nux, a nut.

O

Ob, used to denote that a thing is inverted, as obcordate; a leaf which is heart shaped, but attached by its thinner end.
Obconical, inversely cone shaped.
Obesus, fat, corpulent.
Obliquus, with unequal sides, slanting.
Oblong, longer than broad, with rounded obtuse ends, as the leaves of the Daisy.
Obsolete, indistinct or imperfectly developed, decayed.
Obvolute, having the margins alternately overlapping those of opposite leaves.
Occidentalis, Western, native of the West.
Ocellatus, spotted as with eyes; used when one colour has a bold eye-like spot of another colour upon it, as in Dendrobium fimbriatum oculatum.
Ochraceous or *Ochreous*, clay coloured, or of the colour of yellow ochre.
Ochroleucus, whitish yellow.
Octandrous, with eight stamens, as in the Willowherb.
Octogynous, with eight styles or pistils.

Oculatus, see Ocellatus.
Odes or *Oides*, used in terminations to signify similarity, as Phyllodes, like a leaf.
Odoratissimus, very sweetsmelling.
Odoratus, sweet smelling.
Officinalis, pertaining to a shop; used in medicine.
Oleaginous, having the qualities of oil.
Oleraceous, eatable, suitable for an esculent potherb.
Oligandrous, with stamens fewer than twenty.
Oligos, few in number.
Oligospermous, having few seeds.
Olitorius, relating to culinary herbs.
Olivaceous, greenish brown, relating to the Olive.
Omphalodium, the central part of the hilum, where the nourishing vessels enter.
Oosporangium, the spore cases in some species of Algæ.
Oospores, the fertilised spores of Fungi.
Opacus, opaque, shaded, not shining.
Operculate, covered with a lid, as the flowers of Sarracenia.
Opposite, growing on opposite sides of the stem, but on the same level, as the leaves of the Nettle.
Orbicular or *Orbiculate*, circular and flat; applied to rounded leaves.
Order, an artificial division of the vegetable kingdom.
Organ, a part of a plant that performs a definite function, as the stamen, pistil, etc.
Organography, the description of the organs of plants.
Ornatus, adorned, ornamented.
Ornithopous, bird footed.
Orthos, straight, erect.
Osmosis, the passage of fluids through membranes, as the sap through the cell walls.
Osseous, bony.
Ossified, having become hard as a bone; *e.g.* the stone of a Plum.
Ostreatus, rough like an oyster shell.
Oval, rounded at both ends but widest in the centre, as the leaves of Box.
Ovary, the part of the flower which encloses the young seeds, situated at the base of the pistil.
Ovate, egg shaped, with the broad end downwards, as in the leaves of the Beech.
Oviferous or *Ovigerous*, bearing eggs.
Ovoid, egg-like.
Ovule, the young, unfertilised seed contained in the ovary.
Oxys, sharp, sour, or pointed; oxyacantha, sharp spined.

P

Pachys, thick.
Painted, applied to flowers whose colours are arranged in streaks of unequal density.
Palate, a projection in the throat of a gaping flower.
Paleaceous, chaffy.
Paleæ, membranous chaff-like scales found in the flowers of the Grasses, and also separating the florets in the Scabious.
Pallens or *Pallidus*, pale, whitish.
Pallescens, becoming pale.
Palmate, hand shaped, as the leaves of the Passion Flower and Chestnut.
Palmatifid, cut halfway in a palmate manner, as in the leaves of Ricinus communis.
Palmatilobed, with shallow palmate divisions, as the leaves of the common Maple.
Paludosus, marshy.
Palustre or *Palustris*, marshy, boggy.
Panduratus, fiddle shaped, as the leaves of Rumex pulcher.
Panicle, an inflorescence with the branches irregularly divided, as in the Oat, Phlox paniculata, Saxifraga Fortunei, Pentstemon barbatus, and the Lilac.
Paniculatus, bearing tufts or panicles, as the Golden Rod.
Pannosus, ragged, resembling coarse cloth in appearance.
Papilionaceous, butterfly shaped, as the blossoms of the Pea and Broom.
Papillosus, bearing small nipples or pimples.
Pappus, down; the fine hairs on the fruits of Composite plants, as on the Dandelion.
Papyraceous, like paper or parchment.
Paraphyses, filaments which occur in the fructification of mosses and other Cryptogams.
Parasite, a plant which grows upon and derives its nourishment from another, as the Broomrape and Dodder.
Parenchyma, cellular tissue.
Parietal, attached to the wall of the ovary.
Parterre, a French title given to a collection of gay flower beds, as a "flower garden."
Parthenogenesis, production of perfect seed without the application of pollen.
Partite, divided into segments.
Parvus, small.
Patellaris, dish or platter shaped; circular, with a rim.
Patens or *Patent*, widely spreading, between horizontal and upright; *e.g.* the lip of Salvia patens.
Pathology, the study of diseases.
Patulus, slightly spreading.
Pauci, few.
Pauci-florus, with few flowers.
Paucifolius, with few leaves.
Pavoninus, variegated in colour, like a Peacock.
Pectinate, with numerous segments cut in the manner of a comb.
Pedate, resembling a bird's foot, as the leaves of the Hellebore or the seed vessels of the Bird's Foot Trefoil.
Pedatisect, a pedate leaf with the segments divided in such a manner as to appear distinct leaflets.
Pedicel, the stem which supports a single flower. The radiating stalks which bear the blossoms in the Polyanthus Narcissus are pedicels; the stalk that supports the whole is called a peduncle.
Peduncle, a flower stalk; generally applied to the main floral axis (*see Pedicel*).
Pedunculatus, growing on fruit stalks; opposed to sitting or sessile.
Pedunculus, a fruitstalk.
Pelargos, a stork.
Pellucidus, bright, transparent.
Peloria, applied to flowers, usually irregular, which become regular.
Pelta, a shield.
Peltate, shield shaped, with the petiole attached to the under surface, as in the case of the leaves of the Water Lily and Nasturtium.
Peltatifid, peltate but divided.
Pelviformis, shaped like a shallow cup or basin.
Penciliformis, shaped like a camel hair pencil, as the appendages to the blossom of the Polygala.
Pencillatus, consisting of, or clothed with, tufts of soft hairs.
Pendulus, drooping, hanging down.
Pennate, see Pinnate.
Penninerved or *Pennireined*, having the veins or ribs running from the midrib to the margin, like a feather.
Penta, five.
Pentagonal, with five corners or angles.
Pentagynous, with five pistils.
Pentamerous, composed of five parts. A pentamerous flower has its whorls arranged in fives or multiples of that number; *e.g.* Pentas carnea.
Pentapterous, having five wings.
Pepo or *Peponida*, a name given to the fruits of Cucurbitaceæ; *e.g.* the Melon and Marrow.

Per-, used sometimes as a superlative, as in perpusillus, very weak; at other times to signify through, as perfoliate, through the leaf.
Percurrent, running through from top to bottom.
Perennial, lasting for several years.
Perennis, perennial.
Perfect, generally used to denote that a flower possesses both male and female organs, and calyx and corolla.
Perfoliate, when a stem runs apparently through a leaf, owing to the union of its basal lobes; *e.g.* the upper leaves of Chlora perfoliata.
Peri-, around.
Perianth, the flower cup; generally applied to the floral envelope when it is not differentiated into calyx and corolla, as the blossom of the Lily and Amaryllis.
Perianthium, a cup; *see Perianth.*
Pericarp, the outer covering, rind, shell, or seed vessel of the fruit or seed.
Pericladium, the large, sheathing base of the petiole of Umbelliferous plants.
Periclinium, the involucre of Composite flowers; the common calyx.
Peridermis, the outer layer of bark.
Perigone, same as perianth.
Peregrinus, foreign, strange.
Perigynous, applied to stamens and corollas which are inserted in or combined with the calyx, literally, around the ovary.
Perisperm, the albumen or nourishing matter which surrounds the embryo in the seed.
Perispore, the outer covering of a spore.
Peristoma, the rim around the orifice of the theca in mosses.
Perithecium, a hollow receptacle containing spores found in mosses and fungi.
Perpusillus, very small.
Persistent, remaining until the part to which it is attached is matured, as the calyx of the Pink. Leaves which are evergreen are also called persistent.
Personate, a gamopetalous, irregular corolla, with the lower lip placed in such a manner as to close the orifice of the blossom, as in the Antirrhinum.
Pertuse, having slits or holes.
Pes, foot or stalk; brevipes, short stalked.
Petal, a division of a corolla.
Petaloid, like a petal, coloured.
Petiolans, fixed to the leafstalk.
Petiolaris or *Petiolate*, having leafstalks.
Petiole, the footstalk of a leaf.
Petræus or *Petrosus*, growing in rocky places.
Phænogamous, having conspicuous flowers; visibly furnished with sexual organs.
Phænogams, *Phanerogamia*, or *Phanerogams*, the sub-kingdom of the vegetable world which includes the flowering plants, or those in which stamens and pistils are found.
Phalanges, stamens united by their filaments into bundles.
Phaneros or *Phænos*, conspicuous.
Phlæum, the inner bark or liber tissue.
Phore, *Phorum*, and *Phorus* are used as terminations to denote that which bears.
Phyllaries, bracts or scales which form the involucre of Compositæ.
Phylloclades, branches flattened out to serve the functions of leaves.
Phyllodes, flattened leaf-like petioles, as the so-called leaves of many Acacias.
Phyllodium, *see Phyllodes.*
Phyllody, the changing of an organ into a leaf.
Phylloid, leaf-like.
Phyllomania, production of an abnormal number of leaves, as Begonia phyllomaniaca.
Phyllon, leaf.
Phyllotaxis, the arrangement of leaves on the axis.
Physiology, the study of the functions of plants.
Phytogenesis, the development of plants.
Phytography, plant description.
Phytology, the study of plants generally.
Phyton, *Phytos*, a plant.
Piceus, brownish black.
Pictus or *Picturatus*, *see Painted.*
Pileate, having a cap or *pileus*; *e.g.* the Mushroom.
Pileus, the spreading top of many Fungi.
Pili, hairs.
Piliferous, bearing hairs.
Piliform, formed like down or hairs.
Pilose, covered with long hairs.
Pin-eyed, applied to Primula flowers which have the stigma on a long style, rendering it visible at the top of the tube.
Pinna, one of the segments or leaflets of a pinnate leaf.
Pinnate, applied to a compound leaf with divisions arranged in a regular manner on either side of the midrib, as in Jasminum officinale.
Pinnatifid, divided deeply from the margin almost to the midrib, as the leaf of the Globe Artichoke.
Pinnules, the secondary divisions of pinnate leaves.
Pisiform, shaped like a Pea.
Pistil, the female organ in a flower, consisting generally of the ovary at the base and the style which rises from it and supports the stigma on its top. Sometimes the style is wanting.
Pistillate or *Pistilliferous*, applied to flowers containing one or more pistils, but no stamens.
Pitchers, the tubular leaves of Sarracenias, and the modified leaves of Nepenthes.
Pith, the central, cellular part of a stem, well represented in the Elder.
Pitted, covered with small, depressed spots.
Placenta, the point of attachment of the ovules to the ovary.
Placentiform, shaped like a quoit or a flat cake.
Plaited, folded in plaits or pleats, as the blossom of the Convolvulus or the leaves of Curculigo recurvata.
Planus, flat.
Platy-, large or broad; *e.g.* platyphyllus, broad-leaved.
Pleion, several.
Plenus, full, double; *e.g.* flore pleno, double flower.
Plicate, folded lengthwise, *see Plaited.*
Plumatus, plume-like.
Plumbeus, leaden.
Plumosus, feathery, plumed; *e.g.* the spikes of the Pampas Grass.
Plumule, the first bud or stem of the embryo, generally enclosed by the cotyledons.
Pluri-, many or several; plurilocular, with many loculaments or cells.
Poculiform, goblet shaped.
Pod, generally applied to the fruit or Legume of the Pea family, but botanically used to indicate a one celled, two valved, many seeded vessel which opens in a regular manner.
Podocarp, the stalk which supports the fruit or seed vessel.
Podogynium, a stalk which supports an ovary.
Podosperm, the stalk by which seeds in the ovary are attached to the placenta.
Podus or *Pous*, a foot or stalk.
Pogon, a beard, a collection of long hairs.
Politus, polished. refined.
Pollen, the fine, dust-like substance found in the anthers of flowers. This, by the emission of pollen tubes, fertilises the ovules in the ovary of a plant and so produces seeds.

Pollination, the application of pollen grains to a stigma to effect fertilisation.
Pollinia, masses of pollen found in Orchids and Asclepiads.
Poly-, many, numerous; *e.g.* polyphyllus, many leaved.
Polyadelphus, stamens fused into many bundles.
Polyandrous, many stamened, with more than twenty stamens.
Polycarpic, plants which produce flowers and fruits many times during their lives; many fruited.
Polygamous, applied to plants which bear hermaphrodite as well as male and female flowers; *e.g.* the Ash.
Polygonatus, a stem with many knots.
Polygynous, with many pistils.
Polymorphous, assuming many shapes or forms.
Polypetalous, with distinct and separate petals.
Pome, a fleshy seed vessel without valves, covering the capsule which contains the seeds, as in the Apple and Pear.
Pores, the orifices in the outer cuticle of plants through which transpiration takes place.
Porous, opening by pores.
Porphyreous, brown or warm red in colour.
Porrigens, extending.
Posterior, placed next to the axis of the inflorescence.
Pouch, a short seed pod, as the seed vessel of the Honesty or Shepherd's Purse; the little sac found at the base of some petals.
Præcox, appearing comparatively early, precocious.
Præmorse, with a ragged termination, as though bitten off; *e.g.* the root of Scabiosa succisa or the petals of the common Mallow.
Prænomen, sometimes used to indicate the generic name.
Præstans, good, excellent.
Prasinus, grass green.
Pratensis, growing in meadows.
Prickle, a hardened, sharp, conical appendage formed on the epidermis.
Primine, the outer coat of the ovule.
Primordial, the first to appear, applied generally to the first true leaves formed on a plant.
Princeps, chief.
Prismaticus, with an angular circumference; prism shaped.
Proboscideus, with a hard, terminal horn.
Procerus, very tall, tall and slender.
Procumbent, lying on the ground, as the stems of trailing plants.
Procurrens, running forward.
Profusus, profuse, extravagant.
Proliferous, forming abnormal flowers or shoots; *e.g.* the Hose-in-Hose Primrose and the Hen and Chickens Daisy.
Prolification or *Proliferation*, the production of plants by means of buds rather than by seeds; *e.g.* Asplenium bulbiferum, Lilium tigrinum, bulbiferum, etc.
Pronus, prostrate, lying flat with the face downwards.
Propendent, hanging forward and downward.
Prophylla, primary leaves.
Propinquus, related, near.
Prostratus, prostrate, lying down.
Protandrous, with anthers ripening pollen before the pistils are receptive.
Prothallus, the first stage of a Cryptogamous plant, which is produced by the germination of a spore.
Protogynous, applied to flowers whose pistils are receptive before the anthers have matured their pollen.
Protoplasm, the living matter; colourless, granular, semifluid.
Protrusus, protruding, as the stamens of the Amaryllis or Hippeastrum.
Pruinate or *Pruinose*, covered with glittering particles, frosted.
Prurient, stinging, causing irritation.
Pseudo-, false.
Pseudo-bulb, bulb-like in appearance, but not a true bulb; the thickened leaf-base of many Orchids.
Psilos, thin, bare.
Psittacinus, like a parrot.
Ptero-carpous, wing fruited.
Pteron, a wing.
Pubes, clothing.
Pubescent, clothed with soft downy hairs.
Pugioniform, dagger shaped.
Pulcher, fair, beautiful, pretty.
Pulcherrimus, very beautiful.
Pullus, of a dark brown colour.
Pulposus, soft and tenacious, as the flesh of the Cherry.
Pulveratus, dusted, as the leaves of the Auricula.
Pulverulentus, covered with fine powdery matter.
Pulvinate, cushion or pillow shaped.
Pulvinus, a cushion-like swelling at the base or at the apex of the petiole of some leaves.
Pumilus, dwarf, short, low growing.
Punctatus, dotted.
Punctulate, covered with minute dots.
Pungens, penetrating, pricking, stinging; terminating in a sharp point, as the lobes of the Holly leaf.
Puniceus, bright red.
Purpurascens, becoming purple.
Purpureus, purple in colour.
Pusillus, small or weak.
Pustulate, covered with blister-like, glandular excrescences.
Pustulosus, covered with pimples.
Putamen, the hard inner part of the carpel of a stone fruit.
Pygmæus, dwarf.
Pyracanthus, with yellow spines.
Pyramidal, in the shape of a pyramid or cone.
Pyriform, Pear shaped.
Pyxidate, furnished with a lid.
Pyxis, a capsule which opens by means of a lid, as in Anagallis.

Q

Quadrangularis, four angled or cornered.
Quadri-, four.
Quadrifidus, four cleft.
Quadrifoliate, with four leaves springing from a common point.
Quaternary, arranged in fours.
Quaternate, pinnate, with pinnæ arranged in fours.
Quercifolius, Oak-leaved.
Quin or *Quinque*, five.
Quinate, with the parts arranged in fives.
Quinquefoliate, with five leaves arising from the same point.

R

Race, the name given to a variety of a plant which may be reproduced from seed.
Raceme, a cluster of flowers on stalks arranged singly along a common stem or axis; *e.g.* the blossoms of the Laburnum.
Racemiferous, bearing racemes.
Racemose, growing in racemes.
Rachis, spike stalk; the part of the stalk of a Fern frond which carries the leaflets or pinnæ.
Radiate, like the spokes of a wheel, arranged around a common centre; *e.g.* florets of the Daisy and other Composite flowers.
Radical, belonging to or proceeding from the root; the leaves at the base of the flower stalk.
Radicans, producing roots.
Radicel, a small root, a rootlet.
Radiciflorus, flowering, or appearing to do so, from the root.
Radicle, the embryonic root in a seed.
Radicose, having a large root.
Radii, rays, the outer florets in a radiate compound flower.
Radix, the root; the part which develops from the radicle.
Ramenta, chaffy scales covering the stems and leafstalks of many Ferns and some other plants.

Ramentaceous, covered with scales.
Ramens, belonging to a branch.
Ramifications, sub-divisions of roots, leaves, and branches.
Ramiflorus, producing blossoms on the branches.
Ramosissimus, very much branched.
Ramosus, branched or branching.
Ramulose, bearing many small branches.
Ramus, a branch.
Raphides, needle shaped crystals, generally formed of oxalate of lime, found in plant cells.
Receptacle, the common support of the parts of a flower.
Reclinate, bending backward towards the base.
Rectinervis, with straight and parallel veins.
Rectus, straight.
Recurvo-patent, bent back and spreading.
Reflexed, bent backwards in an abrupt manner, as the petals of the Iris.
Refracted, bent abruptly from the base as if broken.
Regina, queen.
Regular, with uniform and symmetrical parts; *e.g.* the Primrose is a regular flower, the Salvia an irregular one.
Remotus, distant, remote, as the whorls of Salvia interrupta.
Reniform, kidney shaped, as the seeds of the French Bean or the leaves of Nepeta Glechoma.
Repand, having undulated or serpentine margins.
Repens or *Reptans*, creeping; trailing and rooting on the ground.
Replicate, folded backwards so as to form a groove or channel.
Resupinate, inverted through the twisting of the stalk.
Reticulate, netted, veined with a network.
Retiform, formed like network.
Retinervis, with netted veins.
Retroflexus, *see Reflexed.*
Retrorse, bent back in an undulating manner.
Retuse, terminating in a round end with a notched centre.
Revolute, rolled back from the margins, as in some leaves.
Rhiza, a root.
Rhizanthous, apparently flowering from the root, as the Aspidistra and Rafflesia.
Rhizoid, resembling a root.
Rhizome, a root-like stem, on or under the ground, from the under side of which rootlets are emitted. Shoots, leaves, and flower stalks often arise from the upper surface.
Rhizomorphous, of the form of a root.
Rhizotaxis, the arrangement of roots.
Rhodo-, rosy, red.
Rib, a projecting vein of a leaf.
Rictus, the mouth of a two lipped corolla.
Rimosus, marked with cracks, as the bark of an Elm tree.
Ringed, surrounded by circular lines.
Ringent, gaping; applied to a two lipped corolla, as the Mimulus.
Riparius, growing on the banks of rivers.
Rivalis, relating to a brook.
Robustus, strong, robust.
Rosaceous, with separate petals like a Rose; of the colour of a Rose.
Rosea or *Roseus*, Rose coloured.
Rosette, a collection of leaves growing in a clustered circle, like the petals in a double Rose.
Rostellum, a small beak, as found in Orchids.
Rostrate, having a bill or beak, as the pod of a Radish.
Rostrum, an extension resembling a bird's beak.
Rosulate, rosette shaped.
Rotate, wheel shaped; a monopetalous corolla with a very short tube and a spreading limb; *e.g.* the flowers of the Creeping Jenny.
Rotund or *Rotundate*, with rounded outlines.
Rotundifolius, round leaved.
Ruber, red.
Rubescent, reddish, becoming red.
Rubicund, becoming rosy or red.
Rubiginose, of a brown or rusty red.
Rudimentary, arrested in development, incomplete.
Rudis, rough, rude.
Rufescent, reddish, becoming red.
Rufus, ruddy, rust coloured.
Rugosus, wrinkled; *e.g.* the leaves of the Primrose and Sage.
Rugulose, finely wrinkled.
Ruminated, appearing as if chewed; applied to mottled albumen.
Runcinate, toothed at the edge, with the teeth pointing to the base; *e.g.* the leaves of the Dandelion.
Runner, a prostrate shoot which emits roots at its joints or extremity; *e.g.* the Strawberry.
Rupestris, growing in rocky places.
Rupicola, inhabiting rocks.
Rusticus, rustic, rural.
Rutilans, becoming glowing red.

S

Saccate or *Sacciform*, with a pouch or bag.
Saccus, a cup or bag.
Sagittate or *Sagittiform*, shaped like an arrowhead, as the leaves of the Arum Lily.
Salver shaped, blossoms similar to those of the Primrose are termed salver shaped.
Salviæfolius, with leaves like the garden Sage.
Samara, a winged seed vessel, as that of the Elm or Maple.
Samaroid, like a samara.
Sanctus, sacred.
Sanguineous or *Sanguinolentus*, bloody, dull red in colour.
Sap, the vitalising fluid which circulates in the cells of plants.
Saponaceous, soapy, soap-like.
Saprophyte, a plant living and feeding upon decaying vegetable matter.
Sapwood, the new wood of a tree found near the bark.
Sarcocarp, the fleshy portion of a drupaceous fruit. A berry is sometimes called a sarcocarp.
Sarmentosus, yielding runners, as Saxifraga sarmentosa.
Sarmentum, a climbing stem; the thread-like stem of a runner.
Sativus, cultivated.
Saxatilis or *Saxicolus*, inhabiting rocks or stones.
Scaber, rough, with very short, stiff hairs.
Scabrid, rather rough.
Scalariform, ladder shaped; the name given to vessels with bars like a ladder, frequently found in Ferns.
Scalaris, ladder-like.
Scales, small, rudimentary leaves; *e.g.* the leaves of the involucre of Composite plants.
Scalpelliform, resembling the blade of a penknife or scalpel.
Scandent, climbing.
Scape, a long naked stem arising from the root of a plant and bearing the blossoms, as in the Narcissus.
Scapiform, like a scape.
Scapigerous, bearing scapes.
Scar, the mark exposed on a stem by the fall of a leaf.
Scarious, skinny, chaffy, with a dry shrivelled appearance; *e.g.* the involucral leaves of the Cornflower.
Scattered, leaves which are neither opposite nor whorled but thinly disposed.
Schistous, slaty grey, of the colour of the schist rock.
Schiz-, split.
Scillaris, Squill-like.
Scion, a young shoot used in grafting.
Sclerenchyma, cells with walls thickened all over the surface.
Sclerogen, the thickening matter of woody cells.
Scleroid, of hard texture.
Scopulinus, belonging to rocks or cliffs.
Scorpioidal, like the tail of a scorpion, twisted; *e.g.* the inflorescence of the Viper's Bugloss.

Scutate, shaped like an ancient round buckler or shield.
Scutellate or *Scutelliform*, like a disc, platter, or saucer.
Sebiferous, wax bearing.
Secretions, substances produced in the interior of plants and stored in glands.
Sectus, divided to the base.
Secund, arranged on one side only, pointing one way, following.
Secundine, the second or inner coat of an ovule.
Securiformis, shaped like an axe.
Seed leaves or *Seed lobes*, those first appearing from a germinating seed.
Segment, a division of a leaf, or the petal of a Monocotyledon.
Self-fertilisation, the impregnation of ovules with pollen of the same flower.
Semen, seed.
Semi-, half; *e.g.* semicylindrical, half-round.
Semi-lunate, resembling a half-moon.
Seminal, belonging to the seed, as cotyledons or seed leaves.
Semination, seeding.
Seminiferous, seed bearing.
Sempervirens, evergreen.
Senilis, old, decaying.
Sepal, a leaf or segment of the calyx; it is generally green, though examples of coloured sepals are found in Orchids, etc.
Sepaline or *Sepalous*, pertaining to sepals.
Sepalody, the changing of leaves or petals into sepals.
Sepaloid, resembling a sepal.
Septa, partitions.
Septate, separated by a division or septum.
Septem, seven.
Septenate, with parts in sevens; a compound leaf with seven leaflets arising from the same point.
Septicidal, applied to seed vessels which open through the edges of the carpel.
Septiferous, with partitions.
Septifragous, opening through the back of the cells or carpels, with the valves separating from the septa.
Seriate, disposed in rows.
Sericeous, silky, covered with fine, closely pressed hairs.
Serotinus, late flowering.
Serrate, toothed like a saw, as the edge of an Apple leaf; some leaves are doubly serrated, *i.e.* the teeth are again divided; *e.g.* the Elm.
Serratures, the tooth-like divisions of a leaf's margins.
Serrulate, with very small saw-like teeth.
Sesqui-, one and a half.
Sessile, sitting, applied to flowers and leaves without stalks, stigmas without styles, and anthers without filaments.
Seta, a bristle, a stiff hair, or a slender prickle.
Setaceous or *Setosus*, bristly; covered with stiff hairs.
Setigerous, bearing bristles.
Setulose, slightly bristly.
Sex, six; sexfidus, cut into six parts.
Shaggy, rough, with stiff hairs.
Sheath, the lower part of the leaf which is rolled round the stem.
Sheathing, embracing the stem, as the base of the leaves in many Grasses.
Shrub, a woody-stemmed perennial which does not exceed 10′ in height.
Siccus, dry.
Signatus, marked.
Siliceous, flinty.
Silicula, a pod whose breadth is as great as, or greater than, its length.
Siliculose, bearing broad, short pods.
Siliqua, a long pod; *e.g.* the fruit of the Pea.
Siliquose, bearing long pods.
Simple or *Simplex*, the reverse of compound, consisting of one part only; *e.g.* the stem of the Tulip.
Simplicissimus, not branched or divided.
Simulans, imitating.
Siniæ, the recesses between the lobes of leaves.
Sinuate or *Sinuosus*, wavy, having the margin broken up into wavy lobes, as in the Oak leaf.
Soboles, shoots which spring from beneath the ground.
Soboliferous, producing young plants or shoots directly from the roots; *e.g.* the Lilac.
Solaris, relating to the sun.
Solidus, solid, compact.
Solitarius, alone, solitary.
Sordidus, dirty, of a muddy colour.
Sori, the patches on the backs of Fern fronds; consisting of sporangia which enclose the spores.
Sorose, bearing sori.
Spadiceous, like a spadix, bearing a spadix.
Spadix, a succulent spike bearing many crowded sessile flowers and enclosed in a spathe; *e.g.* the central yellow portion of the flower of an Arum Lily.
Sparsus, scattered.
Spathaceous, bearing spathes, or like a spathe.
Spathe, a broad, sheathing bract, situated on the flower stalk beneath the inflorescence, which it often encloses.
Spathulate or *Spatulate*, oblong, with one end broad and the other suddenly becoming narrow.
Spawn, the mycelium of Fungi.
Species, an artificial division of a genus; the name given to a number of individual plants which resemble each other sufficiently to point to a common parentage.
Specific character, the essential character of a species.
Speciosissimus, most handsome.
Speciosus, beautiful.
Spectabilis, remarkable, notable.
Spermatia, the motionless reproductive spermatozoids in Fungi, etc.
Spermatozoids, moving filaments contained in the antheridia of Cryptogamous plants.
Spermoderm, the general covering of a seed, usually applied to the outer coat.
Spermum, seed, or a seed-like part; polyspermum, many seeded.
Sphæricus or *Spheroidal*, resembling a sphere in shape.
Sphærocephalus, applied to flowers growing in close spherical heads.
Spicatus, like a spike, arranged in spikes.
Spike, an inflorescence consisting of numerous sessile flowers on an elongated axis or stem.
Spikelet, a secondary spike; the small terminal collection or cluster of flowers in Grasses.
Spine, a thorn, a sharp pointed, hardened wooden body, an abortive branch ending in a sharp point.
Spinescent or *Spinose*, of a spiny character; bearing spines.
Spinulescent, having a tendency to produce small spines.
Splendidissimus, most brilliant, most splendid.
Spongiole, root hair, the extremity of a root fibre having the power of absorption.
Sporadic, widely distributed; occurring singly in isolated places.
Sporangia, cases found in the sori on the backs of Fern fronds, and which contain the spores.
Spore, a detached cell of Cryptogamous plants which has the power of germinating.
Sporiferous, spore-bearing.
Sport, a bud or seed variation from a plant.
Spumescent, froth-like in appearance.
Spur, a hollow, rounded extension of a flower seen in the calyx of the Larkspur and in some Orchids.
Spurius, false.
Squalidus, rough.

Squama, a scale.
Squamate or *Squamose*, covered with scales.
Squamiformis, scale-like.
Squamula, a small scale.
Squamulose, covered with small scales.
Squarrose, rough, with widely projecting or spreading scales.
Stachys, a spike.
Stamen, the male organ of a flower, consisting of the anther containing the pollen and generally a filament or thread-like stem supporting the anther.
Staminate or *Staminiferous*, applied to male flowers, or plants which bear male flowers or stamens.
Staminode, an abortive stamen.
Staminody, the changing of other organs into stamens.
Standard, the posterior, generally upright petal of a Pea shaped blossom.
Stellate or *Stelliform*, star shaped; arranged in the form of a star.
Stenos, narrow; stenophylla, with narrow leaves.
Sterile, barren; male plants, which do not bear fruits.
Stichous, a row or rank; distichous, in two rows.
Stigma, the summit of the pistil which receives the pollen.
Stigmatic, pertaining to the stigma.
Stigmatiferous, bearing stigmas.
Stipe, the petiole of Palms and Ferns; the stalk supporting the cap of the Mushroom.
Stipels, leaflets, like small stipules, situate at the base of the pinnæ in compound leaves.
Stipitate, having a stalk which is distinct from a petiole or peduncle
Stipulaceous resembling stipules.
Stipulary, occupying the place of stipules; *e.g.* tendrils
Stipulate, having stipules.
Stipules, lateral appendages, generally one on each side, placed at the base of petioles.
Stolon, a branch which arises from near the base of the parent plant, and after travelling along the ground emits roots from its tip, ultimately forming an independent plant; the Violet and the Strawberry are instances.
Stoloniferous, bearing stolons.
Stoma (plural *Stomata*), a mouth-like opening in the epidermal covering of plants; more especially found in the leaves.
Stone, the hard, inner portion of a drupaceous fruit; *e.g.* the Plum.
Stool, the base of a plant which emits shoots for propagation after having been cut down.
Stramineus, straw coloured.
Strap shaped, ligulate, about six times as long as broad.
Strept-, twisted.
Stria, a narrow line or channel.
Striated, scored, marked with parallel lines, as the calyx of the Pink.
Strictus, stiff, straight, upright.
Strigæ, strong, spear shaped bristles or thorns.
Strigose, covered with rough, strong adpressed hairs or bristles.
Strobilus, a cone, the fruit of a Fir tree or Cedar; also applied to the fruits of the Hop.
Strombuliform, spirally twisted into a screw-like body.
Strophiole, a tubercle or swelling found on the surface of some seeds.
Struma, a cushion-like protuberance.
Strumose, covered with tubercles.
Stupose, covered with tufts of long hairs.
Style, the column-like process which, standing upon the ovary, carries the stigma.
Stylopodium, an enlarged disc situated at the base of the style in Umbelliferous plants.
Suaveolens, sweet smelling.
Suavis, sweet, pleasant.
Sub-, nearly, slightly; sub-rotund, nearly round.
Sub-glabrous, nearly smooth.
Sub-kingdom, an artificial division of the vegetable world.
Sub-petiolar, beneath the leaf-stalk.
Sub-species, between a species and a variety; not having the rank of a species, but being above a variety.
Subulate, awl shaped; tapering from the base to a fine point.
Succise, cut or broken off abruptly at the lower end, as the root of Scabiosa succisa.
Succulent, juicy, fleshy.
Sucker, a branch from an underground stem.
Suffrutescent, slightly shrubby.
Suffruticose, herbaceous, but with perennial woody stems, as the Lavender.
Sulcatus, furrowed or channelled.
Sulphureus, sulphur coloured.
Superbus, magnificent, superb.
Superior, growing above anything, *i.e.* the ovary when free from the calyx, or the calyx when attached to the top of the ovary, is called superior.
Supernatant, floating.
Supervolute, when the two edges of a leaf are rolled inwards and one overlaps the other.
Supinus, horizontal, with the face upwards.
Suppression, the complete abortion of an organ.
Supra, above; supra-foliaceous, growing above a leaf.
Surculose, producing suckers.
Surculus, a shoot rising from underground, a sucker.
Suspensor, the stalk of the embryo.
Suspensus, hanging.
Suture, the line formed by the union of the valves of the seed vessel; the place where a Pea pod opens.
Sylvestris or *Sylvaticus*, growing in woods or forests.
Symbiosis, state in which two plants grow together for mutual benefit.
Symphisis, growing together.
Symphyostemonous, having the stamens united.
Syn-, union, adhesion; synantherous stamens are united by their anthers.
Syncarpium, an agglomeration of fruits, as in the Mulberry.
Syncarpous, with carpels united to form one ovary.
Syngenesious, with the anthers united by their edges to form a tube, as in the florets of Composite flowers.

T

Tabulæform, flat topped, table shaped.
Tabularis, flat, relating to boards.
Tails, long, feathery terminations of flowers and fruits.
Tap-root, the continued and thickened radicle in the embryo; a tapering root which penetrates deeply into the ground without dividing; *e.g.* the Carrot.
Tardiflorus, slow in flowering.
Tartareous, with a rough and crumbling surface.
Tawny, dull yellow in colour.
Taxonomy, the classification of plants.
Teated, shaped like an animal's teat.
Tectus, covered.
Tegmen, the second covering of a seed.
Tegmenta, the scales which protect some buds.
Tendril, a slender, twining organ which aids a plant in climbing, well seen in the Vine, or terminating a leaf as in the Pea.
Tenebrosus, dark and gloomy.
Tener, tender, delicate, soft.
Tentaculatus, provided with tentacles or arms.
Tenuis, thin and slender.
Teratology, the study of monstrosities.
Teres or *Terete*, round, cylindrical.
Teretiusculous, roundish.
Tergeminous, applied to leaves which are doubly twin forked.
Terminal or *Terminalis*, ending,

proceeding from the end; *e.g.* the flowers of the Cineraria.

Ternately verticillate, having three leaves arranged in a whorl.

Ternatus, growing or arranged in threes, a leaf consisting of three leaflets; *e.g.* Choisya ternata.

Terrestris, pertaining to the earth.

Tessellatus, chequered, with different colours arranged in squares.

Testa, the skin of a seed.

Testaceous, pale brown in colour.

Testiculate, applied to roots having two oblong appendages; *e.g.* Orchis mascula.

Tetra, four; tetragynum, with four pistils.

Tetrachotomous, applied to stems which branch in fours.

Tetragonal or *Tetragonous*, four angled.

Tetramerous, with all the parts arranged in fours.

Tetrandrous, having four anthers.

Tetraquetrous, with four sharp wing-like angles.

Tetrastichous, with a four angled spike.

Thalamus, the receptacle of a flower, the part which bears the floral organs.

Theca, a sporangium or spore case, found in Cryptogamous plants.

Thecaphore, the stalk which supports the spore case in Cryptogamous plants.

Thermalis, pertaining to warm springs.

Thrixspermum, a hairy seed.

Throat, the orifice of a tubular, monopetalous flower or of a monosepalous calyx.

Thrum-eyed, applied to flowers wherein the anthers protrude beyond the stigma in the mouth of the corolla, as in the Primula.

Thyrse, a dense panicle or cluster, like that of the Lilac.

Thyrsoid, like a thyrse.

Thyrsula, a little cluster; generally applied to that found in the axils of the leaves of Labiate plants.

Tigrinus, striped and spotted like a tiger.

Tinctorius, dyed, relating to dyeing.

Tissue, the substance of which organs are composed.

Tomentose, covered with matted hair, woolly.

Tomentum, dense, close hair.

Torfaceous, pertaining to bogs or marshes.

Torose or *Torulose*, protuberating, swelling unevenly, as the pods of the Broad Bean.

Tortilis, twisted.

Tortuosus, irregularly twisted and turned.

Torus, *see Thalamus*.

Toxicarius, poisonous.

Tracheæ, vessels found in the tissue of plants.

Transpiration, the giving off of water from the surface of a plant; generally greatest from the leaves.

Trapeziformis, flat, but having four unequal sides, the opposite ones not parallel.

Tremulus, quivering.

Tri- or *Tris-*, three, thrice; trifoliate, three-leaved.

Triadelphous, stamens united in three bundles.

Triandrous, having three stamens.

Trichos, a hair.

Trichotomous, with the branches divided into threes.

Tricolor, three coloured.

Tricostate, with three ribs.

Tricuspidate, with three short points.

Tridentate, shaped like a trident; with three teeth.

Trifarious, arranged in three rows.

Trifid, divided into three parts, with three clefts extending about halfway.

Trifoliate, with three leaflets arising from the same point, as in the Clover.

Trigynous, with three styles.

Trijugate, with three pairs of leaflets.

Trimerous, with all the parts arranged in threes.

Trimestris, lasting three months.

Trimorphic, with three forms of flower in the same species, each on different plants, varying in the lengths of their pistils and stamens.

Triœcious, with male flowers on one plant, females on a second, and hermaphrodite flowers on a third.

Tripartite, cut nearly to the base in three divisions.

Tristis, sad, sorrowful.

Triumphans, triumphant, exalted.

Trivialis, ordinary, trifling.

Trochleate, twisted like a pulley.

Tropis, the keel of a Pea shaped blossom, or a part which resembles it.

Truncate, ending bluntly as though cut off; *e.g.* the petals of the Periwinkle.

Tube, the lengthened part of a monopetalous flower which is formed by the cohesion of the edges of the petals; also applied to the calyx.

Tuber, a thickened, fleshy underground stem bearing buds or eyes; *e.g.* the Potato. Also the generic name of some Truffles.

Tubercle, a small wart-like excrescence.

Tuberculatus, bearing small tubers.

Tubercule, a little tuber; applied to fleshy roots which store up food, but which are not big enough to be called tubers.

Tuberous, with fleshy, thickened roots or tubers.

Tubiflorus, bearing tubular flowers.

Tumid, swollen or swelling.

Tunicated, with broad overlapping scales or coats, as in the Onion.

Turbinate, shaped like a top, conical.

Turgid, swollen.

Turio, young shoot covered with scales sent up from an underground stem; *e.g.* Asparagus as when gathered for consumption.

Typicus, typical; applied to a specimen which has eminently the characteristics of its species.

U

Uliginose, growing in marshy places.

Ulmifolius, with leaves like an Elm.

Umbel, an inflorescence in which numerous stalked flowers radiate from a common centre. A compound umbel is an inflorescence whose component parts are smaller umbels. The Agapanthus is a familiar instance of the simple, and the Carrot of the compound umbel.

Umbellate, disposed in umbels, resembling an umbel.

Umbellule, a small umbel, one of the secondary umbels which go to make up an umbelliferous inflorescence.

Umbilicate, navel-like, dimpled, fixed to the stalk by a point in the centre.

Umbilicus, a slender cord by which a seed is attached to the placenta.

Umbonate, round, with a projection in the centre like the boss of a shield.

Umbraculiform, shade yielding; in the form of an expanded umbrella.

Unarmed, without prickles or thorns.

Uncate or *uncinate*, provided with hook-like processes; hooked at the end.

Unctuous, fat or oily.

Undulatus, waved.

Unguiculate, applied to petals which have a claw at the base, as those of the Pink.

Unguis, a claw, the narrowed part of a petal.

Ungulatus, hoof shaped.

Uni-, one; uniflorus, one flowered.

Unicus, single, only one.

Unilateral, growing on one side only; turned to one side.

Unisexual, bearing male or female organs only.
Urceolate, shaped like an urn or a pitcher.
Urens, stinging.
Utilis, useful, serviceable.
Utilissimus, most useful.
Utricle, a thin walled bottle shaped cell, a membranous bladder.
Utriculate or *Utriculose*, bladder-like, consisting of bladders.

V

Vacillans, wavering.
Vacuole, a space in the protoplasm of a plant which contains the sap of the cells.
Vacuous, empty; generally applied to parts which are normally filled, but whose contents have disappeared.
Vagiform, of uncertain shape.
Vagina, the sheathing expansion of the base of a leaf.
Vaginans, sheathing.
Vaginatus, sheathed.
Validus, powerful.
Valvate, united by the margins to form valves or doors.
Valves, the divisions of a capsule.
Variabilis, variable.
Varians, changing.
Varicosus, swollen intermittently.
Variegatum, variegated.
Variety, a plant which differs from others of the same species, but not sufficiently so to have specific rank accorded it. A variety often does not come true from seed; a species invariably does so. A variety is therefore less "fixed" than a species.
Variolate, marked with small depressions.
Vas, a vessel.
Vascular, consisting of tissue in the shape of vessels or channels.
Vasculum, the botanist's collecting tin.
Vegetus, vigorous.
Veins, the bundles of vessels, fibro-vascular, which form the ribs of leaves.
Velutinus, with a velvety appearance, covered with very fine soft hairs.
Venation, the arrangement of the veins in leaves.
Venose, veined.
Ventral, belonging to the inner surface of a carpel, used in contradistinction to dorsal.
Ventricose, inflated, swelling unequally on one side.
Venustus, charming, lovely.
Vermicular, worm-like, either in shape or movements.
Vernal or *Vernus*, pertaining to the spring.
Vernation, the arrangement of leaves in the bud.
Vernicose, appearing as if varnished, as the flowers of many Cypripediums.
Verrucose, covered with wart-like excrescences.
Versatile, fixed in such a manner as to readily turn about; swinging to and fro.
Versicolor, of various colours.
Vertebrate, contracted at intervals with a joint at each contraction; like the backbone of an animal.
Vertex, the uppermost point or apex of an organ.
Vertical, upright.
Verticel, a whorl; parts arranged opposite each other at the same level.
Verticillaster, a false whorl, composed of two opposite inflorescences, as in the Dead Nettle.
Verticillate, arranged in a whorl; with the parts disposed in a circle around a common axis.
Vertilinear, in a straight line.
Verus, true.
Vesicle, a small, hollow excrescence resembling a bladder.
Vesicular or *Vesiculose*, inflated, appearing as if formed of bladders.
Vespertinus, relating to the evening; expanding in the evening.
Vessels, tubes formed by the amalgamation of a vertical row of cells, and having their ends closed.
Vestitus, clothed.
Vexillarius, bearing standards.
Vexillary, having when in bud one larger part overlapping and enveloping the others, as in the blossoms of the Sweet Pea.
Vexillum, the standard or large upper petal in Pea shaped blossoms.
Villi, soft hairs.
Villous or *Villosus*, covered with long loose hair; having a woolly appearance.
Vimineous, having long slender and flexible twigs or shoots, as the Osier.
Vine, a trailing or climbing stem.
Violaceous, violet coloured.
Virens, green.
Virescent, becoming green.
Virgate, twiggy, long and straight like a wand.
Virginalis or *Virgineus*, virgin, maiden.
Viridescent, greenish, becoming green.
Viridis, green.
Viscid or *Viscous*, clammy, adhesive, sticky.
Vitellinus, yellow, like the yolk of an egg.
Vitellous, persistent.
Viticulose, bearing Vine-like twigs or suckers.
Vittatus, with long ribbon-like stripes.
Viviparous, producing young plants or leaf buds in place of seeds; plants which produce bulbils in the axils of the leaves. Asplenium viviparium is an example of the first, Lilium tigrinum of the second.
Volubilis, twining.
Volva, a curtain or wrapper covering the fructification in some Fungi while young.
Vulgaris, common, ordinary.
Vulpinus, relating to the fox.
Vulviform, shaped like a cleft, with protruding margins.

W

Wattled, with processes like the wattles of a cock.
Whorled, arranged in a circle.
Whorls, leaves, flowers, or branches arranged in circles around a common stem. Examples are the leaves of the Martagon Lily, the flowers of Primula verticillata, and the branches of the Fir.
Wing-cleft, almost divided to the midrib on either side, as the leaves of the Shirley Poppy.
Wings, the lateral petals of a Pea shaped flower, the flat membranous appendages of some seeds; *e.g.* the Elm.

X

Xanthophyll, the yellow colouring matter of plants.
Xanthos, yellow.
Xerophilous, requiring a hot and dry atmosphere.
Xylem, woody tissue of plants.
Xylo-, woody; xylocarpum, woody fruited.

Y

Yuccæfolia, with leaves like a Yucca.

Z

Zantho-, yellow; zanthoriza, with yellow roots.
Zonalis or *Zonatus*, marked with zones or bands.
Zones, stripes, belts, bands.
Zoophilous, fertilised by insects, insect loving.
Zoospore, a moving spore furnished with fine hairs.
Zygo-, united; zygophyllum, with united leaves.
Zygomorphic, divisible into two similar halves in only one direction.

USEFUL TABLES.

HARDY ANNUALS.

Genus.	Species or Variety.	Popular Name.	Colour.	Height.	Time of Flowering.
Abronia	umbellata	Everlastings	ro.	6″	
Amaranthus	caudatus	Love-Lies-Bleeding	crim.	2′	
Asperula	azurea setosa	Blue Woodruff	bl.	1′	
Bartonia	aurea		yel.	1½′	
Cacalia	coccinea	Tassel Flower	or. sc.	1½′	sum.
Calandrinia	grandiflora		ro.	1½′	
,,	speciosa		magenta	9″	
Calendula	officinalis (several vars., including doubles)	Marigold	yel. and wh.	1′	
Callirhoë	pedata		pur. crim.	2′	Aug.
Centaurea	Cyanus (several vars.)	Cornflower	bl. and var.	3′	Jy. to Sep.
,,	Moschata	Sweet Sultan	pur.	2′	Jy. and Aug.
,,	odorata		yel.	1½′	
Centranthus	macrosiphon		red	1½′	July
,,	macrosiphon albus		wh.	1′	
Chrysanthemum	carinatum (several named vars., including burridgeanum)	Annual Chrysanthemum	wh.,cr.,yel., and sc.	2′	Aug
,,	coronarium (several vars.)	Annual Chrysanthemum	wh. and yel.	3′	sum.
,,	segetum	Corn Marigold	yel.	1½′	
,,	segetum grandiflorum				
Clarkia	elegans (many vars.)		rosy pur. and various	2′	July
,,	pulchella		various	2′	June
Collinsia	bicolor		pur. wh.	1′	Aug.
,,	bicolor alba		wh.	1′	
,,	grandiflora		pur. bl.	1′	July
,,	verna		wh. and bl.	1′	May
Collomia	coccinea		red	1½′	June
,,	grandiflora		red, yel.	1½′	
Convolvulus	major (correctly Ipomœa purpurea)	Convolvulus	various	climber	sum.
,,	minor		various	1′	
Coreopsis	Drummondii		yel. and cr.	2′	June
,,	tinctoria		yel.	2′	July
Datura	ceratocaula		wh.	3′	
,,	Stramonium	Thorn Apple	wh.	2′	
Delphinium	Ajacis (several vars.)	Annual Rocket, Larkspur	bl.	1½′	sum.
,,	Consolida (several vars.)	Branching Larkspur	bl.	2′	
Erysimum	perofskianum		or.	1½′	May and Aug.
Eschscholtzia	californica	Californian Poppy	yel.	1½′	June
,,	californica (many vars.)		various	1½′	
,,	C. tenuifolia		or. and cr.	1′ to 1½′	
Eutoca	viscida		bl.	1′	sum.
Gilia	achilleæfolia		bl.	1′	Aug.
,,	dichotoma		wh.	6″	sum.
,,	tricolor (many vars.)		various	1′	June
Godetia	(many named vars.)		various	6″ to 18″	
Hibiscus	Trionum		yel.	2′	sum.
,,	Trionum major		prim., yel., and vio.	2′	
Humulus	japonicus	Japanese Hop		climber	
,,	japonicus variegatus	Variegated Hop		climber	

Genus.	Species or Variety.	Popular Name.	Colour.	Height.	Time of Flowering.
Iberis	umbellata (several vars.)	Candytuft	various	1′ to 1¼′	sum.
,,	violacea		pur.	3″	
Kaulfussia	amelloides		bl.	6″	
Lathyrus	odoratus (many vars.)	Sweet Pea	various	climbers mostly	sum. to aut.
Lavatera	trimestris	Mallow	wh. and ro.	3′ to 6′	
,,	trimestris alba		wh.	3′ to 6′	
Lavia	elegans		yel. and wh.	1′	
,,	elegans alba		wh.	1′	
Leptosiphon	densiflorus (several vars.)		bl. and wh.	3″ to 6″	sum.
Linaria	reticulata (several vars.)		yel.	2′ to 3′	
Linum	grandiflorum (several vars.)	Scarlet Flax	ro.	6″ to 12″	
Lupinus	atrococcineus hybridus		crim. sc.	2′	July
,,	Hartwegii		bl. and wh.	2′	
,,	nanus		lil. bl.	1′	
,,	nanus albus		wh.	1′	
,,	subcarnosus		bluish yel.	1′	
Lychnis	Cœli-rosa		ro., wh., or pur.	1′	sum.
Malcomia	maritima	Virginian Stock	various	6″ to 12″	spr. to aut.
Malope	trifida		pur. or wh.	1′ to 1½′	sum.
,,	trifida grandiflora (several sub-vars.)		ro.	1½′ to 2′	
Malva	moschata	Musk Mallow	ro.	2′ to 2½′	
,,	moschata alba	White Musk Mallow	wh.	2′ to 2½′	
Matthiola	bicornis	Night - Scented Stock	pur. red	1′	July
,,	tricuspidata		bl.	1′	
Mimulus	guttatus	Monkey Musk	various	1′	
Nemesia	strumosa (several vars.)		various	8″ to 15″	
Nemophila	insignis (several vars.)		bl.	6″	sum.
Nigella	hispanica	Love-in-a-Mist	bl.	9″ to 12″	
,,	hispanica alba (also double vars.)	White Love-in-a-Mist	wh.	12″ to 15″	
Œnothera	speciosa rosea	Evening Primrose	ro.	6″	
Omphalodes	linifolia	Venus' Navelwort		6″ to 12″	June to Aug.
Papaver	Rhœas var.	Shirley Poppies	various	6″ to 12″	sum.
Phacelia	campanularia		bl.	1′	
,,	tanacetifolia		bl.	1½′	
Reseda	odorata (several vars.)	Mignonette	red and wh.	6″ to 12″	sum. and aut.
Sanvitalia	procumbens (also a double var.)		yel.	6″	sum.
Saponaria	calabrica		pk.	6″	
,,	calabrica alba		wh.	6″	
Senecio	elegans (many vars., single and double)	Jacobæa	various	1½′	
Silene	pendula (several vars., including compacta)	Catchfly	pk.	4″	
Statice	spicata		ro.	1′	
,,	Suworowi		bright ro.	15″	
Tropæolum	majus	Nasturtium	various	climber	sum. and aut.
,,	dwarf vars.		various	10″ to 15″	
,,	canariense	Canary Creeper	yel.	climber	
Whitlavia	grandiflora		vio.	1′	sum.
,,	gloxinioides		wh. and bl.	1′	
Xeranthemum	imperiale		vio.	2′	sum. and aut.
,,	superbissimum		pur.	2″	

Note.—Seed of all the subjects in this list may be sown out of doors about the beginning of April, either in places where they are to flower or in seed beds, the young plants being afterwards transplanted. Some of them are not strictly annuals, but become perennials when placed in such favourable circumstances that more or less continuous growth is possible.

HALF-HARDY ANNUALS.

(* See note at the end of the table.)

Genus.	Species or Variety.	Popular Name.	Height.	Colour.	Time of Flowering.
Aster . . . (see Callistephus)		China Aster			
Ageratum . .	mexicanum	Ageratum	1′ to 1½′	bl.	summer
„ . . .	mexicanum album (several good bl. named vars.)	Ageratum	1′	wh.	summer
Alonsoa . . .	gracilis		1′	red	July
„ . . .	linifolia		1½′	sc.	summer
„ . . .	Mutisii		1′	pk. and crim.	sum. and aut.
„ . . .	Warscewiczii compacta		1′	bright sc.	summer
Amaranthus . .	melancholicus ruber		1′	lvs. crim. fls. inconspicuous	July
Browallia . . .	demissa (elata)		1½′	bl. and wh.	summer
Callistephus . .	hortensis (many vars.)	China Aster	6″ to 24″	various	late sum. and aut.
Cosmea . . .	bipinnata		3′	ro. and wh.	sum. and early aut.
Dianthus . . .	Heddewigii and vars.)	Indian or Japan Pink	6″ to 9″	various	summer
Exacum . . .	affine		6″	vio. pur.	
Impatiens . .	balsamina (many vars.)	Balsam	1½′ to 2′	various	sum. and early aut.
Loasa . . .	aurantiaca		climber	or.	
Lobelia . . .	Erinus (many vars)	Lobelia	6″	wh., bl., and pur.	summer
Martynia . . .	fragrans		2′	mauve	
Matthiola. . .	incana	Brompton, Queen, and Wallflower-leaved Stocks	1′ to 2′	various	
„ . . .	incana annua	Ten-Week Stock	1′ to 2′	various	May to Oct.
Maurandia . .	barclayana		climber	vio. pur.	summer
„ . . .	barclayana luceyana		climber	pk.	
Mesembryanthemum	crystallinum	Ice Plant	3″	lvs. grn. and wh.	
Mina . . .	lobata		climber	red, wh., and yel.	
Nicotiana. . .	affinis	Tobacco	3′	wh.	
„ . . .	sylvestris	Giant Tobacco	6′	wh.	
„ . . .	grandiflora purpurea	Giant Tobacco	5′	reddish pur.	
Petunia . . .	many vars.	Petunia	1′ to 2′	various	
Perilla . . .	nankinensis		2′	lvs. pur.	
Phlox . . .	Drummondii		1′	various	
Portulaca. . .	grandiflora (many vars. known as compacta)	Sun Plant	6″	yel. and pur.	
Pyrethrum . .	parthenifolium aureum	Golden Feather	1′	wh., lvs. yel.	
„ . . .	parthenifolium selaginoides	Golden Feather	1′	lvs. finely cut	
Ricinus . . .	communis	Castor-oil Plant	3′ to 5′	lvs. large, grn.	
„ . . .	communis Gibsonii	Castor-oil Plant	4′ to 5′	lvs. bronze pur.	
Salpiglossis . .	sinuata (several vars.)		2′ to 4′	various	
Schizanthus . .	pinnatus	Butterfly flower	1′ to 3′	bl. and ro.	
„ . . .	retusus		1′ to 3′	or. and ro.	
Tagetes . . .	erecta (many vars.)	African Marigold	3′	various shades of yel.	
„ . . .	patula (many vars.)	French Marigold	1½′ to 2′	various	
„ . . .	signata	Striped Mexican Marigold	1½′	yel.	sum. and aut.
„ . . .	signata pumila	dwarf ditto	10″ to 12″	yel.	sum. and aut.

Genus.	Species or Variety.	Popular Name.	Height.	Colour.	Time of Flowering.
Thunbergia . .	alata		4′ cl.	yel. and blk. eye	sum. and aut.
„ . . .	aurantiaca		4′ cl.	or	
Zinnia . . .	elegans	Zinnia	1′ to 2′	various	summer

* Some of the plants named in the foregoing list are not really annuals, but it is found convenient to cultivate them as such, either because there is a difficulty in keeping them through the winter, or because the best flowers are borne by young plants. The qualifying "half-hardy" means that some artificial heat is necessary in the early stages of the plant's existence. Thus it is usual to sow the seed in fairly brisk heat (about 60°) under glass towards the end of February or the beginning of March, the seedlings being pricked off into pans or boxes as they (the plants) become large enough to handle. Hardening off is practised during May, and the end of that month or the beginning of the next finds the plants consigned to their flowering quarters outdoors.

TRAINED FRUIT TREES.

Fruit.	Method of Bearing.	Shape of Trees.	Aspect of Wall if Grown Outdoors.
Apples	Spur	Fan. Vertical and oblique single or multiple cordons. Horizontal cordons. Espalier.	S., S.W., N.W.
Apricots	* Spur and extension	Fan	S. in the midlands, S., S.W., and W. in the south of Britain.
Cherries, Sweet . . .	Spur	Fan	W., S.W., S.E.
„ Morello . .	Extension	Fan	E., N.E., N.
Currants, Red and White .	Spur	Gridiron or multiple cordon	N., N.E., E.
Figs	Extension	Modified fan, growths being trained from stool	S., S.W., W.
Gooseberries . . .	Spur and extension	Fan and gridiron or multiple cordon	N., N.E., E.
Nectarines	Extension usually, spur occasionally	Fan	S., S.E., S.W., W.
Peaches	Extension usually, spur occasionally	Fan	S., S.E., S.W., W.
Pears	Spur	Single or multiple vertical or oblique cordons. Horizontal cordons. Horizontal or espalier trained	S., S.E., E., S.W., W.
Plums, Gage . . .	Spur	Fan	S., S.E., W., S.W.
„ Victoria . . .			W., E., and S.E.
„ Coe's Golden Drop			N., N.E., E.
Vines	Spur. Extension for a few varieties, like Duke of Buccleuch	Cordon	S., S.W.

* The systems of pruning are broadly two: (1) The "spur," which necessitates a summer pinching of the young shoots, followed by a winter pruning; (2) the "extension," under which system new wood is trained in annually to take the place of the old, and to bear fruit the following year. The old bearing wood is usually cut out after the fruit has been gathered. Some trees may be trained upon either of these methods. Again, as in the case of the Apricot, and to some extent of the Peach and the Nectarine, a compromise between the two systems is effected, shoots that cannot be trained in being pinched to form spurs.

GARDEN FRIENDS.

ANIMALS (INCLUDING INSECTS) THAT ARE OF SERVICE TO GARDENERS.

GENERIC NAME.	SPECIFIC OR VARIETAL NAME.	POPULAR NAME.	REMARKS.
Apanteles	glomeratus	Ichneumons	larvæ parasitic upon White Cabbage Butterfly
Apis	mellifica	Honey Bee	gives honey; assists in the pollenising of flowers
Bombus	Lucorum	Humble or Bumble Bee	pollenises flowers
„	terrestris	Humble or Bumble Bee	pollenises flowers
Braconideæ (*see* Apanteles)	(many species)	Ichneumon Flies	larvæ parasitic upon injurious insects
Bufo	vulgaris	Toad	feeds upon insects, chiefly by night, but also on dull days; excellent for placing in Cucumber and Melon houses
Carabus	nemoralis	Ground Beetles	feed upon snails and insects, both living and dead
Chilopoda	(many species)	Centipedes	feed upon insects
Chrysopa	vulgaris	Lacewing Fly; Golden-eyed Fly	feeds upon aphides
Cicindela	campestris	Tiger Beetle	larvæ and perfect insects feed upon insects
Coccinella	bipunctata	Two-spotted Ladybird	feed upon aphides; some of the most useful of all insects
„	septempunctata	Seven-spotted Ladybird	feed upon aphides; some of the most useful of all insects
„	undecempunctata	Eleven-spotted Ladybird	feed upon aphides; some of the most useful of all insects
„	variabilis	Variable Ladybird	feed upon aphides; some of the most useful of all insects
Copris	lunaris	Unicorn Beetle	helps to bury decaying vegetable matter
Drilus	(several species)		feed upon snails
Epeira	diadematа	Garden Spider	feeds upon moths and aphides
Goerius	olens (*see* Ocypus)	Devil's Coach Horse Beetle	preys upon insects
Harpalus	(several species)	Ground Beetles	although carnivorous, these occasionally adopt a vegetarian diet
Hemerobius	(several species)	Lacewing Flies	feed upon aphides
Hypena	proboscidalis	Snout Moths	feed upon nettles
Ichneumonideæ (*see* Apanteles, Rhyssa, and Thalassa)	(many species)	Ichneumon Flies	larvæ parasitic upon many injurious insects
Lampyris	noctiluca	Glow-worm	larvæ feed upon snails
Linyphia	(several forms)	Gossamer Spiders	feed upon flies
Lumbricus	terrestris communis	Earthworms	promote soil aëration and fertility
Lycosa	(several forms)	Hunting Spiders	feed upon flies
Macroglossa	Stellatarum	Humming-bird Hawk Moth	pollenises flowers of Honeysuckle and other flowers with long tubes
Microgaster (*see* Apanteles)	glomeratus	Ichneumons	
Mustela	vulgaris	Weasel	hunts rabbits
Neriene	(several forms)	Gossamer Spiders	feed upon flies
Neuroptera	(several forms)	Lacewing Flies	feed upon aphides
Ocypus	olens	Devil's Coach Horse or Cock-tail	feeds upon slugs, worms, and snails
Rhyssa	(several species)	Ichneumons	larvæ parasitic upon injurious insects; feed upon insects
Salticus	scenicus	Leaping Spiders	feed upon flies
Scolopendra	electricus	Light-bearing Centipede	feeds upon insects
Syrphus	(many species)	Hawk Flies	prey upon aphides
Testacella	haliotidea	Slugs	live on earthworms
„	Maugei	Slugs	live on earthworms
Thalassa	(many species)	Ichneumons	live on earthworms
Thrips	Phylloxeræ	Thrips	larvæ parasitic on injurious insects
Vanessa	Antiopa	Camberwell Beauty	feed upon Nettles
„	Atalanta	Red Admiral Butterfly	feed upon Nettles
„	Io	Peacock Butterfly	feed upon Nettles
„	Urticæ	Small Tortoise-shell Butterfly	feed upon Nettles
Vespa	Crabo	Hornet	feeds upon other insects, including wasps
Walckenaera	(several forms)	Gossamer Spiders	feed upon flies

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